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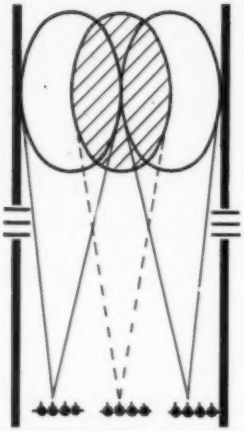
Employment of the Heavy Mortar Company in the Attack

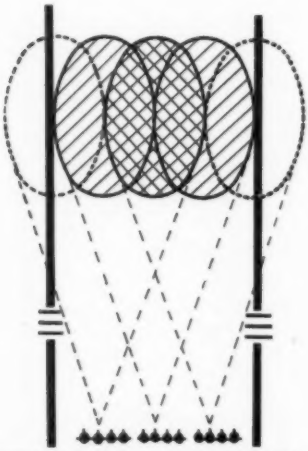
Reorganization of the Infantry, as effected by the current Tables of Organization and Equipment, has greatly increased the firepower of the infantry regiment. The addition of a heavy mortar company provides the regimental commander with the firepower of twelve 4.2-inch mortars. Although untried in combat as an infantry company, the potential effectiveness of this new unit can be estimated by studying the operation reports of chemical mortar companies in the past war. The organization of the heavy mortar company is similar to that of the chemical mortar company, and both units are equipped with the same primary weapon.

The characteristics and capabilities of the present heavy mortar (Chemical Mortar, 4.2-inch M2) and the doctrine governing the employment of the company in defense have been published previously. The following discussion is a presentation of the doctrine governing the employment of the heavy mortar company in the attack. The broad principle emphasized is that in the attack, the heavy mortar is a regimental weapon, and as such, is normally employed under the control of the regimental commander.

The present effective range of the M2 Mortar is 4,400 yards; however, it is expected that in the near future the range will be increased. The mortar can be traversed 125 mils to the right and 125 mils to the left by using the traversing hand wheel; a total traverse of 700 mils can be obtained by shifting the standard (see figure 1). Targets outside of this sector can not be engaged without moving the base plate. It is desirable that the position areas for the platoon be from 800 to 1,200 yards in rear of the front



ONE 4.2-INCH MORTAR CAN COVER A WIDTH OF 500 YARDS
AT A RANGE OF 2,000 YARDS WITHOUT SHIFTING STANDARD



ONE 4.2-INCH MORTAR CAN COVER A WIDTH OF 1,400 YARDS
AT A RANGE OF 2,000 YARDS BY SHIFTING STANDARD.

LEGEND

FIRE OF ONE PLATOON

MASSED FIRE OF TWO PLATOONS ON CALL

MASSED FIRE OF THREE PLATOONS ON CALL

FIGURE 1.

lines in order to provide the maximum flexibility of employment. These characteristics are the basic factors governing the employment of the heavy mortar company in an offensive operation. This weapon and its ammunition, like all other weapons, is being tested and studied to determine what improvements can be incorporated and still permit the weapon to maintain the basic characteristics which make it desirable for use in the Infantry. Improvements of the weapon and its ammunition which increase range, traverse, mobility, or other factors, also influence the tactical employment of the weapons.

ORGANIZATION

The heavy mortar company is organized into three firing platoons and a company headquarters platoon. Each firing platoon has a platoon headquarters and four firing squads. Each eight-man squad operates a heavy mortar. The company headquarters is divided into three sections, namely; the headquarters section, the operations and fire direction section, and the communication section (see figure 2).

In each platoon headquarters there is a platoon leader, a platoon sergeant, a staff sergeant forward observer, a liaison corporal, an instrument corporal, two voice-radio operators, two drivers and a messenger. The specific duties of these individuals are indicated by their job titles.

The personnel of the headquarters section are grouped, according to the nature of their duties, into a command group and an administration group. The command group includes the company commander, company reconnaissance officer (executive officer), first sergeant, reconnaissance sergeant, bugler, messengers, orderlies, and truck drivers. The mortar company commander advises the regimental commander on the employment of the heavy mortars. In the attack the reconnaissance officer is usually occupied with reconnaissance duties, and his administrative duties are performed by other personnel.

The administration group of the headquarters section includes the mess steward, cooks, mess attendants, supply

ORGANIZATION AND IMPORTANT ITEMS OF EQUIPMENT

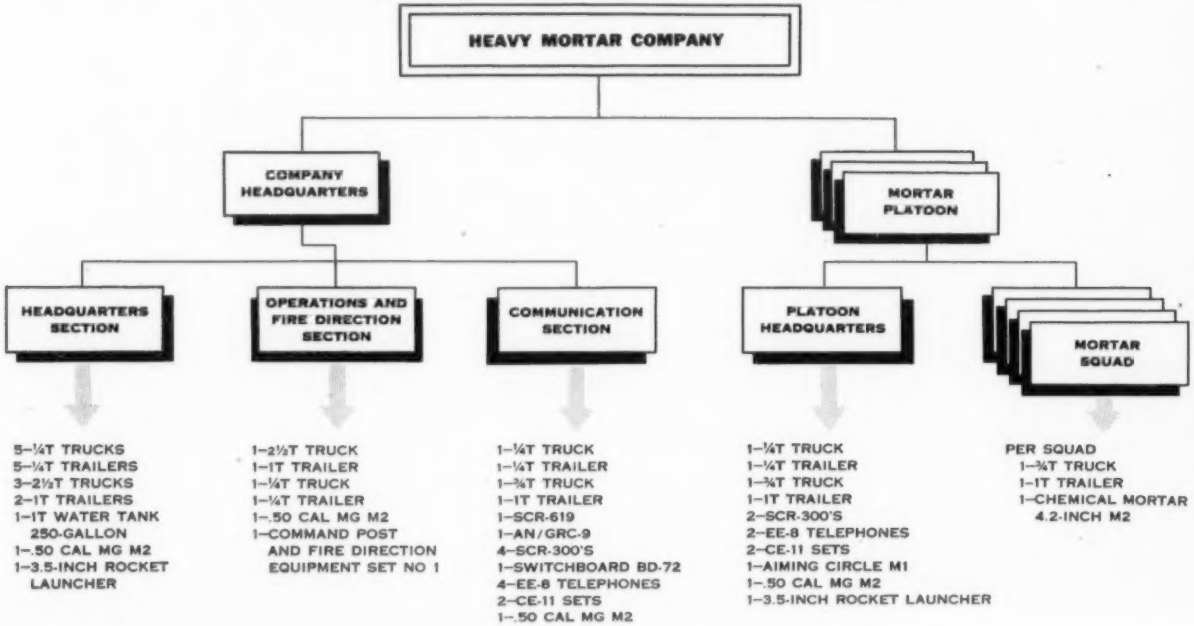


FIGURE 2.

sergeant, motor sergeant, ammunition sergeant, armorer, clerk, and automotive mechanics. This organization represents a normal administration group except for the ammunition sergeant, who is included to assist in handling the extremely difficult and important problem of ammunition supply.

The operations and fire direction section is commanded by the gunnery officer. To assist him in preparing firing data for the platoons, he has an operations sergeant, three computers, and an operator for the horizontal control. The survey group consists of a survey sergeant, a survey corporal, and two survey technicians.

The communication section has a communication sergeant (chief of section), seven radio operators, five linemen, and two switchboard operators. These individuals maintain and operate the communications equipment in company headquarters.

The heavy mortar company commander makes recommendations to the regimental commander, who makes decisions regarding the employment of the company. The regimental commander usually merely tells the heavy mortar company commander what heavy mortar support he desires; however, the regimental commander may assign position areas, targets, or sectors of fire; he may specify the time or conditions under which firing will commence; and he may designate the manner in which the company will be controlled. The relationship between the heavy mortar company commander and the regimental commander is similar to that between a heavy weapons company commander and his battalion commander. In an offensive operation the heavy mortar company commander, like the heavy weapons company commander, is particularly concerned with reconnaissance, control, displacement, and ammunition supply.

Reconnaissance is a continuous function. It takes place before, during, and after the fight. Since the reconnaissance officer and the reconnaissance sergeant are the company commander's chief assistants in this duty, they normally constitute the nucleus around which a reconnaissance

group is forward. However, the company commander not only plans and orders reconnaissance, but he makes his own reconnaissance at appropriate times. The number of personnel used for reconnaissance depends on the time available, the type of terrain, and the extent of the regimental zone of action. During the period of preparation for an attack, the reconnaissance group is usually augmented by selected personnel from company headquarters and from the platoons. Suggested additions include the bugler, messengers, and orderlies from company headquarters, and platoon leaders, liaison corporals, and instrument corporals from the platoons. After the initial reconnaissance has been made, however, the reconnaissance officer and reconnaissance sergeant probably will be able to perform this duty without assistance.

In order to control and direct the elements of the company, the commander utilizes both personnel and communication equipment in the same general manner as in any other company. In an offensive situation radio communication is the most commonly used method of controlling all elements of the company. There are ten SCR-300 radios in the company—four in the company headquarters and two in each platoon. One of the company headquarters radios and one of each of the platoon radios constitute the forward observer net as shown in figure 3. Another four radios may be used for communication between the platoon firing positions and the fire direction center. The other two SCR-300 radios are used for utility purposes. They are used during the displacement of the fire direction center and they must be used when additional observation posts are manned. In addition, the company is equipped with an AN/GRC-9 radio, which operates in the regimental net, and an SCR-619 radio, which is in the supporting artillery net.

In an offensive operation wire is layed whenever the situation permits. In general, wire communication parallels the radio nets (see figure 4).

Displacement is made on vehicles because the mortars and the ammunition are too heavy to be carried any appreciable distance by hand. The company displaces by platoon.

HEAVY MORTAR COMPANY RADIO NET

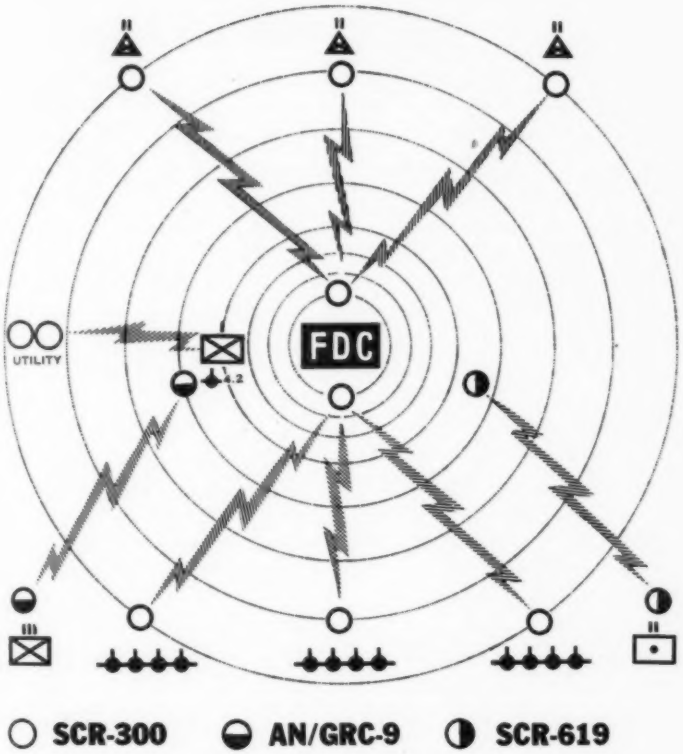


FIGURE 3.

The forward echelon of the operations and fire direction section moves with the first platoon to displace, and establishes a forward fire direction center. The rear echelon moves forward at the same time the last platoon displaces.

Ammunition supply is a tremendous problem. The supply sergeant, the ammunition sergeant, and the motor sergeant are the company commander's chief assistants in accomplishing this function. In addition to the organic company transport, there is in the regimental service company a

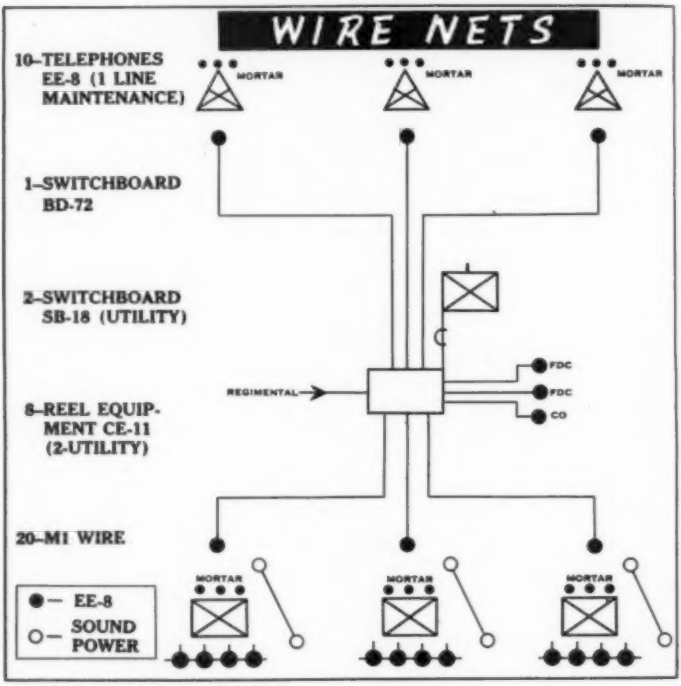


FIGURE 4. Heavy Mortar Company wire net.

heavy mortar company section consisting of five 2½-ton trucks and five 1-ton trailers four of which transport ammunition. One of these trucks and trailers transports the company kitchen, but in an emergency it can be used to carry ammunition.

TACTICAL EMPLOYMENT

The tactical employment of the company in an offensive operation can be divided into four phases: movement to contact, preparation for the attack, the attack, and the reorganization.

In the movement to contact phase extensive use is made of intelligence and reconnaissance agencies and rapid means of communication. As a result, prior to making contact the heavy mortar company commander usually has access to all available information regarding the location and disposition of the enemy force. Based on this information he makes timely recommendations to the regimental commander for the employment of the company. In movement to contact, the regiment assumes formations to meet conditions encountered; the heavy mortar company is assigned a suitable position within the regimental formation and adopts a suitable march formation. Movement to contact is divided into three phases, which may be called the route column phase, tactical column phase, and approach march phase.

During the route column phase (the phase in which enemy ground action is remote, and speed, control, and administrative considerations govern) the heavy mortar company moves as a unit under company control—in most cases with the regimental motor column. The company commander remains with the company.

During the tactical column phase (the phase in which enemy ground action is improbable) the units of the regiment are placed in tactical groupings to facilitate prompt adoption of combat formations when the need arises. The heavy mortar company usually marches as a unit under company control well forward in the regimental motor column.

During the approach march phase (the phase in which enemy ground action is imminent) the regiment may move with one battalion as an advance guard or it may have one, two, or three battalions laterally deployed in any suitable approach march formation. When the leading battalion is employed as the advance guard, a platoon of heavy

mortars is normally attached to the battalion, and the remainder of the company is well forward in the regimental column—usually behind the leading battalion of the main body. When one or more battalions are laterally deployed in an approach march formation, the heavy mortar company is under company control to facilitate emplacing platoons in positions to give timely fire support when contact is made. Whether or not a platoon is placed in firing positions in order to provide immediate fire support depends upon the tactical situation and the location of the enemy. In any case, liaison corporals, reconnaissance personnel, and forward observers move with the leading unit of the battalion(s). The company commander may move with the advance guard commander or with the regimental commander.

PREPARATIONS FOR ATTACK

When the regiment moves behind adequate covering forces, the heavy mortar company is usually assigned an assembly area. While in a firing position area or an assembly area, preparations are made for the attack. A reconnaissance is made, coordination with other units is effected, recommendations for employment are submitted, and orders are issued. The company is responsible for its own security while in the assembly area. All individual weapons, the six caliber .50 machine guns (one in each section of company headquarters and one in each platoon) and the four 3.5-inch rocket launchers (one in company headquarters and one in each platoon) are used for this purpose. Preparation for the attack is initiated by a reconnaissance plan. This plan provides for the prompt establishment of observation posts to help determine proper target areas. Because units already in contact with the enemy can frequently provide valuable information, the plan includes arrangements for contacting the commanders of units in contact. Position areas for the platoons and routes thereto are located, as well as routes for displacement and ammunition supply.

Initial coordination with other supporting units, especially with the field artillery, is made during the preparation phase. Contact is established between the infantry regiment and artillery battalion by command liaison (contact between respective commanders) and by direct liaison with artillery liaison sections attached to front-line infantry battalions. By the assignment of missions the regimental commander coordinates the fires of the heavy mortar company with those of the artillery. Liaison agents from the mortar platoons maintain contact and coordinate with the artillery liaison officer and with the infantry battalions. Heavy mortar and artillery forward observers, when operating observation posts in the same vicinity, may also coordinate on targets and exchange information.

Tactical control falls into three catagories: general support, direct support, and attachment. Under normal conditions the heavy mortar company in the attack is employed in general support of the regiment with priority of fires of one platoon allotted to each assault battalion. Normally platoons are not assigned direct-support missions. However, a platoon may be attached to an advance guard battalion or to a battalion operating beyond supporting range of the elements of the heavy mortar company employed in general support. Based on the reconnaissance made by the mortar company commander, the regimental commander determines the method of control to be employed.

After receiving the regimental attack order the mortar company commander issues a company order. This order is the crystallized plan for utilizing the supporting fires of the company, and must be made known to all concerned. If time is short, as in the case of a rapidly moving situation, it may be necessary for the company commander to issue fragmentary orders. Whenever practicable he issues his attack order to the platoon leaders, reconnaissance officer, gunnery officer, and selected noncommissioned officers. Throughout the subsequent progress of the action fragmentary orders will normally be employed.

ATTACK

During the attack it is of prime importance that the company carry out its mission of providing close and continuous support to the assault echelon. All actions that were initiated during the preparation period are continued. Displacement is anticipated, and position area(s) are reconnoitered to insure that timely displacement is made. Ammunition problems are solved, and a constant flow of ammunition is maintained. Recommendations are made to meet changing tactical situations. The company commander locates himself where he can best control the company and maintain continuous communication with the regimental commander.

REORGANIZATION

Reorganization, as the term applies to the heavy mortar company, involves consideration of two problems: first, the mission of providing continuous fire support to the assault elements, and second, the necessity for reorganizing the company itself. To accomplish the first mission the platoons of the heavy mortar company either support the reorganization from positions used to support the final assault, or they are moved to positions from which they can best cover likely approaches to captured objectives.

Normally, the reorganization of the company itself is not completed until the regimental objective is reached, but the commander must be alert to take advantage of a temporary cessation of hostilities to carry out partial reorganization. Reorganization of the company is not complete until leaders who have become casualties are replaced, ammunition bearers or replacements replace other casualties, the ammunition supply is replenished, and the unit is prepared to carry out a subsequent mission. Each platoon provides its own local protection while the reorganization is in progress.

SUMMARY

The heavy mortar company provides the regimental commander with a powerful weapon with which to reinforce the

regiment's firepower. In order to obtain the maximum results, the platoons are usually employed under company control so that the fires of all twelve mortars can be concentrated with devastating effect on a particular part of the regimental front.

To realize the maximum benefit from this unit, the company commander must provide the regimental commander with current recommendations concerning the capabilities of the company. In the attack such recommendations are based on information obtained from the regimental intelligence agencies, as well as first-hand information gained from reconnaissance personnel assigned to the company. A continuous flow of information and recommendations permits the regimental commander to determine the most effective time and place to employ the firepower of the heavy mortars, thus providing effective fire support for the attacking troops.

Raids

From the inside of the barracks, the thirteen-foot barbed wire enclosure around the camp was barely visible in the faint moonlight. Occasionally a Japanese sentry silhouetted himself against the horizon as he walked slowly from corner to corner. Suddenly a staccato burst of submachine gun fire from the vicinity of the guards' barracks broke the silence. At the same time the door of the prisoners' barracks burst open.

"This is a rescue party! Grab your clothes and follow me," shouted the figure in the doorway.

Twenty minutes later, the survivors of the ill-famed Bataan death march were outside of the prison camp and headed for sanctuary behind friendly lines.

Perhaps the most spectacular because of the emotion packed interest it contained, this release of the prisoners of war at Cabanatuan, P. I., was but one of many successful raids of World War II. Another was the raid on Dieppe, France by a picked force of British and Canadian soldiers. This joint operation employed the support of naval vessels. Examples from the past war of our present raiding methods are chronicled in a number of Commando raids executed by British and Canadian troops.

Although World War II was the proving ground for our principles and technique of raids, many of the methods employed in wars throughout history are applied to our modern concept of this type of operation. The use of raiding forces to accomplish a particular mission behind enemy lines is almost as old as warfare itself.

In the early historical accounts of raids, the purpose was to acquire loot or sometimes just to glorify a commander. As tactics grew more complex, raids assumed importance as military maneuvers. In the past war and in World War

I, raids were conducted principally to obtain information of the enemy's dispositions, his strength, his methods of defense, and his intentions.

In modern tactics, a raid is an attack usually launched against a limited objective. It is not designed to hold ground. Planning necessary to implement a raid is made in the same manner as for an attack except consideration is given to the withdrawal of the raiding force.

Raids are also employed to inflict damage and casualties on the enemy, to destroy his defensive installations and supply dumps, and to disrupt his communications. Under favorable circumstances, raids are sometimes employed as a means of instilling confidence and an aggressive spirit in troops.

Raids, classified according to the character of the operation, may be nuisance raids, intelligence raids, supply raids, or destruction raids. They can be further classified according to the size of the raiding force as battalion raids, company raids, or platoon raids. High-level planners think of raids in terms of the force which conducts them—air raids, ground raids, sea raids, or joint raids. Of most concern to the infantry commander is whether the raid is to be a daylight or a night raid, and if it is to be unsupported or supported.

An unsupported raid is made without the fires of supporting weapons. Depending primarily on surprise, it utilizes darkness, fog, or smoke for protection. A typical unsupported raid is one requiring the capture of a few prisoners and an immediate withdrawal. Because stealth and surprise are prime requisites, a very small raiding force is generally used to avoid detection. This type of raid is made usually at night or under other conditions of low visibility. Conduct of an unsupported raid does not preclude delivery of fires in areas fairly close to the objective. On the contrary, enemy movement that might cause disruption may be reduced and distraction and deception increased by the delivery of fires in nearby areas during the time that the raid is in progress.

A supported raid employs the fires of the regimental supporting weapons and artillery. The supported raid may be executed in daylight or darkness. It is used when the raiding force expects to fight more than a single enemy group or when it expects to remain within enemy lines for a long time. Employment of supporting weapons is essential to furnish protection, particularly during the withdrawal phase.

Normally, raids are not initiated by commanders of front-line units. In order to insure coordination of the operation as a whole, the directive prescribing a raid usually originates with a regimental or higher commander. Each subordinate headquarters in the chain of command is responsible for issuing a specific set of instructions.

Assume, for example, that a division commander orders that certain information be obtained or that a particular harassing or destruction mission be conducted. The division prescribes which regiment is to do the job and issues orders specifying the mission and establishing a time limit for its accomplishment. Division also designates what support, such as artillery, engineers, and air photo reconnaissance units, is available at division level.

When this information is received at a regimental headquarters, the regimental commander may issue a warning order to the battalion responsible for the operation—if it is to be a battalion size raid. After studying the mission and consulting his staff, the regimental commander issues a detailed order which designates the general area to be raided (unless the general area is designated by division) and specifies whether the raid is to be made in daylight or darkness. The order indicates which supporting weapons of the regiment, such as tanks, heavy mortars, or supporting weapons of battalion not engaged, will be made available to support the raiding force.

When the battalion commander receives the warning order, he selects the commander of troops and the unit to make the raid. After receiving the detailed regimental order, he prescribes the detailed mission and objectives, the routes of advance and withdrawal, the final assembly area, the

rallying point, and the exact time for initiating the raid. The battalion commander is responsible for coordinating the employment of supporting weapons and arranging for rehearsals.

The detailed plan for the raid is the responsibility of the commander of troops. He makes up the organization of the raiding force, divides the unit into task forces to accomplish specific missions, makes a reconnaissance of the approaches and routes into the area, prepares a plan of maneuver, arranges for special equipment, issues the order, trains and briefs the troops, and directs the action of the raiding force.

The result of the detailed planning is condensed into an order which every soldier can understand. Written and oral instructions must be clear and simple. A simple plan of action is just as essential in a raid as in a night attack. The individual soldier is briefed on the enemy situation, the mission, the routes to be followed, the tasks to be performed by his group, the route of withdrawal, and the rallying point for the unit.

PLANNING

A raid is a special operation adapted to a particular situation and no two raids can often be planned alike. Thorough reconnaissance and careful planning will serve to limit successful and unexpected enemy reaction, but it must be borne in mind that no matter how carefully and thoroughly a raid is conceived and planned, unforeseen emergencies requiring immediate action must be expected, and the raiding force must have the means and capacity to react successfully against unforeseen enemy action.

The selection of the point to be raided is of primary importance. The best planned and executed raid will fail unless a suitable objective or objective area is selected. In general, the area selected should:

Be a key location known to be occupied and containing something of military value that can be destroyed or captured.

Be difficult for the enemy to defend, affording routes of approach containing dead spaces and limited fields of fire.

Be as close as possible to the front lines. If it is necessary to conduct a raid over a great distance, there is a greater likelihood for loss of control and direction. It is more difficult to obtain surprise when moving deep into enemy territory.

Be subject to isolation by supporting fires, particularly artillery, if the raid is a supported raid.

After the point to be raided has been selected, a route of approach for the raiding party is determined. The route of advance should be distinguishable by terrain features if the raid is to be made at night. The route of withdrawal should differ as much as possible from the route of advance. Road intersections and prominent land marks are avoided by a distance equal to the bursting radius of enemy shell fire.

A final assembly area is selected where last minute coordination can be effected. This area should be defiladed from enemy fire and should be well within friendly lines. A wooded area not subject to unusually large amounts of enemy artillery and close to the point of entry to the enemy lines is satisfactory.

A rallying point, in a concealed and defiladed locality within friendly lines, is prescribed by the battalion commander. After the withdrawal, troops assemble at the rallying point, and all materiel, prisoners, and information gathered during the raid are collected and promptly forwarded to higher headquarters. Rallying points for reorganization are also designated in the vicinity of the objective.

The time to begin the raid is another vital subject in planning. Supported raids preferably are carried out at dawn, twilight, or under condition of low visibility. Thus hostile observation is limited but there is enough light for close combat purposes. Moonlight gives sufficient illumination for this type of operation. Supported raids have, however, been executed in either broad daylight or in full darkness. A successful daylight raid depends on the ability of

supporting weapons to blind all enemy artillery observation posts with smoke.

The date for the raid is set far enough in advance to allow the maximum time for reconnaissance, planning, registration of supporting fires, and rehearsals. At least one night should intervene between the receipt of orders for the raid and its execution.

The purpose of supporting fires is to neutralize all hostile positions within effective radius of the area to be raided and to box in the objective area to isolate the defending troops. Artillery may be employed to fire on adjacent and rearward hostile positions and on avenues of approach to the raided area, both during the raid and the withdrawal. Preliminary fires are seldom used, however, the strength of the position may require that a preparation be placed on the area to be raided. Mortars, both 4.2-inch and 81-mm, are employed to extend or fill the gaps in the fires of the artillery. Machine guns are used to place bands of fire near the flanks of the area, or to thicken artillery or mortar fires on suitable targets.

All supporting fires are prearranged. Concentrations are fired at a specified time, on call from observers, or by a prearranged signal (flare). Signals also may be used for shifting or lifting fires. If certain weapons are to fire on more than one target during the raid, specific instructions for shifting their fires are included in the order. The accuracy and effectiveness of supporting fires must be insured in advance. This does not necessarily mean that registration is invariably necessary in the target area for the raid. It is preferable *not* to pre-register the fires provided acceptable accuracy can be obtained through accurate survey or point registration within the battle area but avoiding the raid area. Where registration must be made in the raid area it should be made on a considerable number of points in addition to those for which data is desired in order to preserve secrecy. Any area once fired on becomes suspicious, and total surprise is best obtained when initial fires are delivered on the area.

Every army seems to have a different idea on how to organize and train units for raids. The Germans organized selected units highly trained in the art of raiding. The Japanese trained no special units for raid operations but trained the individual soldier in night attacks and close-in fighting, thus making him an effective raider. Prior to World War II, the British gave special raid training to one platoon of each infantry battalion. Later they organized the Commandos as special raiders, and at the close of the war, they were training all infantry platoons in raiding technique. In the United States, six Ranger battalions were trained and used in World War II. Our present training policy favors the British method of training all infantry platoons in some raid technique.

When organizing a raiding force, it is best to select soldiers especially trained in raid technique. Because these men are seldom available in the numbers desired it is best to build the raiding force for a small-scale operation around a few trained men and then add additional selected men to units.

Team work within the raiding force may be improved by prior rehearsal of the raid when permitted by time, available terrain, the position of the raiding force, and when justified, by the complexity of the plan and the nature of the objective. When rehearsals for a night raid are conducted the first should be held in daylight and thereafter repeated in darkness under conditions as close as possible to those anticipated in the raid.

In organizing the raiding force, the commanding officer of troops subdivides his units into smaller task forces, each organized and equipped to accomplish a specific job. The exact organization varies with each situation. In general, assault parties are organized to attack the enemy at specific points, to perform specific tasks of destruction, or to capture prisoners. In addition, support parties are organized to protect the flanks of the assault groups. Tactical unity is maintained to the maximum extent possible. Leaders for each party are carefully selected but are preferably those familiar by previous association with members

of the party. The guiding principle governing organization is to keep the raiding force to the minimum size consistent with the mission. Control, concealment, and surprise become more difficult as the size of the unit increases.

The formations used in night raids are similar to those used in daylight operations, although the commander of troops may designate special formations to fit the mission.

Special equipment and clothing may be provided. Included may be submachine guns, brass knuckles, black jacks, snow suits or terrain camouflage suits, and a means of carrying cumbersome material. An experienced man should be armed with his favorite weapon. The rule is to avoid overburdening the individual and to give some consideration to his choice of equipment.

If a raiding force must pass through enemy barbed-wire entanglements, leading elements are provided with wire cutters to make passages through the wire. In some cases, surprise may be forfeited by employing artillery or bangalore torpedoes to destroy the entanglements. Experienced mine men accompany the leading elements to breach any mine fields on the routes of advance or withdrawal.

COMMUNICATION AND CONTROL

The raiding party must have a means of communication with the next higher commander, communication to the fire control element of the supporting units, and communication between elements of the party. Light portable radios are the most dependable means available. Wire may be laid as an auxiliary means, but it is easily broken by men moving around in the dark or by artillery and mortar shells falling near the circuit.

Pyrotechnics may be used to designate the time of withdrawal or to specify the execution of alternate plans, particularly when radio and wire fail to function. Flares may be used in accordance with the current signal operation instructions to request lifting or shifting of artillery or mortar fires. Pyrotechnics are usually considered emergency means, because an alert enemy frequently fires a number of flares to cause confusion.

The degree of control which can be maintained over the elements of a raiding force varies with the size of the force and the conditions of visibility. If the raid is made at night, control is maintained in the same manner as in a night attack. The leaders determine that units are in the right formation, that direction of movement is correct, that contact between individuals is maintained, and that noise is held to a minimum. The problem of control in a daylight raid is greatly simplified.

In either type of raid the commander of the raiding force must be in a position to control the elements. After the force moves out, the most that a higher commander can do is to lift or shift supporting fires, be on the alert for unexpected hostile reactions, and take suitable measures to meet an unforeseen emergency. The raid commander must be in a position where he can observe the action, effect any necessary changes in the plan, and order the withdrawal.

A means of recognition between individuals is necessary in a night raid. This may be accomplished satisfactorily by the use of phosphorescent paint on the rear of helmets, radium buttons, arm bands, or colored flashlights. A password and reply system supplements other means, but it is not considered sufficient in itself.

When the withdrawal is ordered, units hastily reorganize before moving back to the rallying point. The raid commander follows the foremost elements to the rallying point and checks the units as they return. Complete reorganization is effected behind friendly lines.

II

RAID ON SCHIERWALDENRATH

The raid on Schierwaldenrath, Germany, which took place 7 October 1944, is an example of a supported raid. This action illustrates the problems inherent to most raid operations:

The necessity for careful planning and reconnaissance.

The need for control of supporting weapons.

The necessity for coordination and cooperation between units.

The units involved in this account are the 1st Battalion, 115th Infantry Regiment, 29th Infantry Division, and Company A, 121st Engineer Battalion (attached to the 1st Battalion, 115th Infantry).

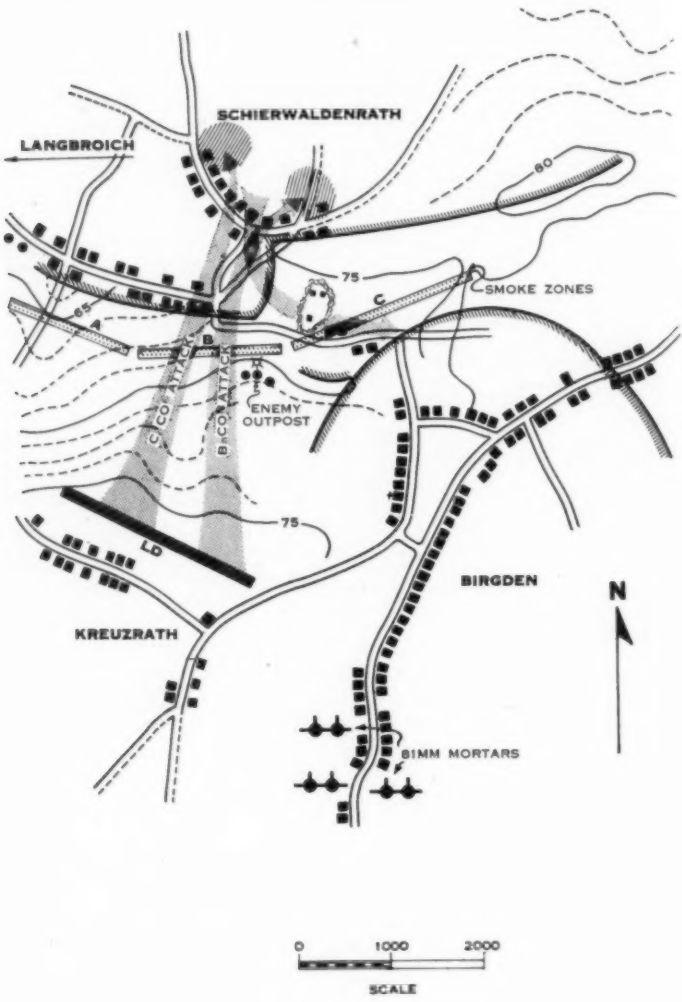
On 3 October, a rifle company, 115th Infantry Regiment, initiated an attack to take and hold Schierwaldenrath. This company was virtually annihilated. As a result of the action, the regimental commander ordered the 1st Battalion, 115th Infantry to raid Schierwaldenrath. The battalion mission was to rescue any Americans held in the town, to obtain information of the lost company, to destroy the town, and to bring back prisoners. The location of Schierwaldenrath and the enemy positions in the vicinity made holding the town unfeasible.

On 5 October, the 1st Battalion Commander was called to the regimental command post to receive the order for the raid. The battalion commander was asked for his recommendations on supporting weapons and the time to launch the raid.

The battalion commander called for artillery support for his operation and decided to begin his attack at 0400 hours, 7 October. The withdrawal would be made when the mission was accomplished. No artillery preparation was to be fired. The raid was to depend on stealth, speed, and timing, until the attack was discovered, and then the supporting artillery would assist by firing concentrations on call. All officers were given a copy of the concentration overlay.

The battalion commander and his S-3 had good observation over the area from the church in Birgden. (See Map 1.) The area in front of Kreuzrath was bare and flat and offered no protection. Between Birgden and Schierwaldenrath was a settlement made up of several houses and trees which offered some protection for troops forced to cross the open terrain. As the settlement was not in friendly hands, regiment ordered the 3d Battalion, then occupying Birgden, to capture it simultaneously with the raid of the 1st Battalion.

RAID ON SCHIERWALDENRATH 3-7 OCT 44



Map 1.

Because it was not known how much difficulty the 3d Battalion would encounter in taking the settlement it was decided to launch the raiding forces from assembly positions in Kreuzrath. However, withdrawal from Schierwaldenrath was to be executed over the shorter route, through the settlement, to Birgden.

PLAN OF ATTACK

After making a visual reconnaissance and a careful study of aerial photos of the area, the battalion commander and his staff formulated a plan for the attack.

The 1st Battalion would attack with two companies abreast, Company C on the left, Company B on the right, each company in column of platoons, widely deployed. The Company C objective was the left (west) edge of the town; the Company B objective was the right (east) edge of the town. (See Map 1.) Company A would follow in platoon waves fifty to seventy-five yards apart. The engineers would follow Company A closely. Initially, the heavy machine-gun platoons would accompany the engineers; one section would later join each of the leading companies. The 81-mm mortars would support the attack from positions in rear of Birgden.

The leading companies would move forward quietly without firing unless discovered and then, with fixed bayonets, rush the defenders. There would be no halts until the leading companies reached their objectives. Company A would mop up and protect the rear from a counterattack.

On reaching their objectives, all units were to dig in, set up automatic weapons, and organize for defense while previously designated mop-up squads took care of any enemy opposition from within the defensive positions.

The engineers would pass through Company A and split into two parties. One party would join each of the leading companies. Each engineer soldier would carry a 20-pound pack charge which would be used to demolish one of the 41 houses in the town. Only the church would be left standing. The demolition work would begin as soon as the town had been sufficiently cleared to permit the engineers to work in reasonable safety.

The formation adopted was based on an estimate that the enemy main line of resistance would be located on the perimeter of the city under cover of trees and orchards, and that reserves would be located in nearby houses and cellars. By making the penetration from the south and then fanning out rapidly, the commander hoped to catch the defenders from the rear.

In order to maintain secrecy the fire support plan deliberately omitted preliminary artillery and mortar fires. After the attack was discovered, normal artillery procedure would govern. The fire plan included three zones to be smoked by the artillery on call. The town was surrounded by concentration areas. Defensive fires for the mortars were worked out in a similar manner. Only one artillery forward observer was available, but another officer was substituted to provide the two leading companies with observers. All three companies had mortar observers.

It is interesting to note that in this operation wire was to be laid by all three companies as they advanced; thus it was hoped that at least one line would remain in operation. Radio silence was to be maintained until the attack was discovered.

PLAN OF WITHDRAWAL

When these details had been worked out, a plan of withdrawal was made. The engineers would come out first followed by Company C, which had advanced the greatest distance. Company C would leave a covering shell of two men per squad under command of an officer. Company B would withdraw next in a similar manner. Both companies would pass through Company A, withdraw to the settlement, and thence move to positions around Birgden. Company A would withdraw last. In a designated spot in the center of Schierwaldenrath, each company would leave a runner who would notify the officer in charge when it was time to withdraw the covering shell.

If necessary, the withdrawal would be covered by artillery fire or smoke on any area designated by the forward observers. If the withdrawal took place during daylight,

the ridge to the north would be smoked. Orders for the withdrawal would come from the regimental commander through the battalion commander.

THE RAID

The battalion commander gave the order for the raid in the late afternoon of 6 October. This provided enough time for the company commanders and platoon leaders to orient their men and make a further reconnaissance, as the movement to the assembly area at Kreuzrath was not to begin until 2400 hours.

The night before the raid, a combat patrol was sent out from Kreuzrath to determine the location of enemy machine guns by drawing their fire. The patrol was successful in finding two machine gun positions in addition to determining that the front was well outposted with riflemen.

Promptly at 0400 hours on 7 October the companies moved out across the moonlit fields and each wave disappeared in the ground fog which fortunately obscured vision beyond 150 yards.

The first shots were fired about 30 minutes after the attack started. They seemed to come from the left flank. The firing stopped temporarily, and then a few more shots were heard. After this sporadic firing, the crackle of small arms opened up all along the front. Enemy machine guns could be heard between the bursts of fire from friendly weapons. A few flames were seen springing up in the buildings in the town and the firing grew in intensity.

A few minutes later the companies began to report in by phone. They stated nothing except that they were making progress toward their objectives. By 0610 hours all companies had reached their objectives, but the engineers had not yet started their demolition work. A radio inquiry to the engineers indicated that they were setting their charges and would soon be ready. Just before dawn, huge mushrooms of flame, smoke, and debris began to appear all over town, and the battalion commander knew that the engineers were accomplishing their mission.

The wire lines were not dependable, and as time went on and the firing became more intense, they ceased to function altogether. Communication by SCR-300 radio was excellent, however, and the loss of the wire lines did not hamper the operation.

The enemy's reaction to the surprise attack was as expected. Soon after the companies reached their objectives the enemy opened up with artillery and small-arms fire. They shelled the area between Kreuzrath and Schierwaldenrath, presumably to block the route to the town or to knock out reserves believed to be that area. When the enemy believed he had neutralized the approaches to the town, he turned his guns on the troops holding the town.

Wounded men drifting back to Kreuzrath reported that enemy resistance on the perimeter of the town was light, but that there was plenty of fighting in the town. Most of the enemy troops would fight hard for a short time and then surrender. A wounded officer reported that there was no sign of any man from the missing Company K, but that two of the American tanks used in the previous attack were still in the town.

At 0745 hours, a messenger reported that Company C was being attacked by three tiger tanks and 300 infantry, and that they were unable to call for artillery fire on the counterattack force because the company radio could receive but could not transmit. Some artillery assistance was obtained for Company C by a runner who transmitted a fire request over Company B's radio. At the same time Company B reported that they were being hard pressed by attacking tanks.

Both Companies B and C requested permission to execute the withdrawal. When it was determined by radio that the engineers had completed their mission, the request was granted. By the time the withdrawal was started, 13 enemy tanks were taking part in the counterattack. The three companies, totaling 250 men, had only old type rocket launchers and rifle grenades to combat the tanks.

When the withdrawal was authorized, the battalion command post moved to Birgden to take over when the 3d Battalion was relieved. The 3d Battalion had captured the settlement without difficulty and was assisting in evacuating the wounded and the prisoners. By 0830 hours the companies were out of Schierwaldenrath and the covering force was withdrawn. The companies reorganized at Birgden and the relief of the 3d Battalion was accomplished in good order.

The raiding force captured 99 prisoners, killed 54 enemy, and destroyed two tiger tanks. The battalion casualties were six men killed and 52 men wounded. It was estimated that the town was 80 per cent destroyed as a result of the firing and demolitions.

After the raid the officers and men who participated in the operation made the following recommendations:

Each company should carry an extra radio.

Mortar observer radios must be on a channel separate from the battalion command channel.

Pyrotechnic signals for requesting defensive fires should be arranged.

Heavy machine guns should accompany the assault companies so that they would be readily available when the objective had been taken. (In this raid they moved forward with the engineers and were slow in moving up to the companies.)

An artillery forward observer should accompany each company.

A small force should not be expected to hold a large area against an aggressive enemy for more than four hours.

The results of this operation indicated the value of a raid in battalion strength. Detailed planning and thorough reconnaissance paid dividends in success. The intelligent use of supporting fires permitted the raiding force to withdraw from contact with a superior attacking force without difficulty. The comparative ease with which the raiding force breached the hostile main line of resistance and reached their objectives indicates that surprise is the most valuable asset that a raiding force can have.

COMPANY RAID

Historical examples are of value as a medium of instruction because they serve to illustrate the application of principles. The foregoing example illustrates the execution of a raid under a particular set of circumstances.

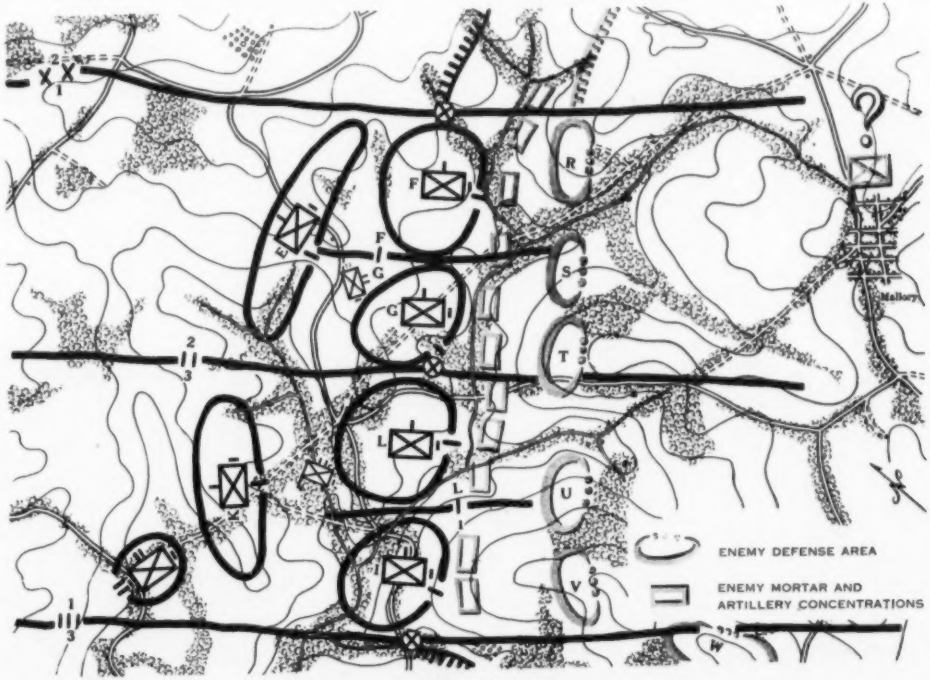
The following assumed situation illustrates planning a raid in company strength under a different set of circumstances. The same principles apply to both situations. It is given here in the form of a map problem so that you—the reader—may put yourself in various command positions and solve the requirements as they might arise in this situation.

Situation. The 1st Infantry Regiment is in position with the 2d and 3d Battalions holding the main line of resistance and the 1st Battalion in reserve (See Map 2). At 0800 hours, 1 July, Colonel, 1st Infantry received the following message from the Commanding General, 1st Division:

> Intelligence sources report that the enemy to your front has installed a secret device, believed to be electronic in nature, in the area west of the town of MALLORY. You are directed to make a raid on the enemy position within the next 72 hours with the mission of capturing the equipment and returning it to our lines. You will also capture prisoners from the vicinity of the installation. The accompanying map (Map 2) shows the latest G-2 information on the location of the installation. Three technicians from corps headquarters will accompany the raiding force to examine the equipment in case it cannot be moved. Your operation will be supported by a battalion of light artillery. Photo reconnaissance, engineers, and other services are available.

After Colonel, 1st Infantry studied the mission he briefed his staff on the pertinent parts of the order. He ordered the S-2 to assemble all available information on the enemy forces in the area to be raided, to obtain sufficient maps or aerial photos of the area for distribution to each officer in the raiding force, and to determine what enemy troops were located in the vicinity of the town of Mallory.

The regimental S-3 was ordered to submit recommendations on the unit to make the raid, to determine the best


ENEMY DEFENSE AREA
ENEMY MORTAR AND
ARTILLERY CONCENTRATIONS

Map 2.

date and time for starting the raid, and to determine what supporting fires would be available to the raiding force.

The S-2 was unable to collect any information on the enemy other than that shown on the division map (Map 2). He was able to secure sufficient maps for distribution to each officer in the raiding party. The S-2 was unable to determine the size of the hostile reinforcements available in the town of Mallory.

The S-3 recommended that the 1st Battalion, now in reserve, furnish the raiding unit. The S-3 further recommended that the raid be conducted on the night of 3-4 July as there would be moonlight after 2230 hours. Darkness on that night would fall at 1935 and daylight would commence at 0440 hours. To support the raiding force, the S-3 recommended that in addition to the battalion of light artillery, the fires of the Heavy Mortar Company and the supporting weapons of the 2d and 3d Battalions be employed.

The regimental commander incorporated the recommendations of the S-2 and S-3 into his plan and gave the commander of the 1st Battalion the following instructions:

> You will make a raid with elements of your battalion on the night of 3-4 July to obtain the secret electronic equipment at the location shown on the map and to capture prisoners. Three technicians will accompany your force to examine the equipment in case it cannot be moved. On 3-4 July darkness falls at 1935 hours, the moon rises at 2230 hours, and daylight breaks at 0440 hours. You will be supported by one battalion of light artillery, the Heavy Mortar Company, and the heavy weapons of the 2d and 3d Battalions. Submit your plan by 2 July.

Lieutenant Colonel, 1st Battalion arranged for the commanders of the supporting units to meet at his command post later for a conference and then returned to his battalion to make his plan.

First requirement. You are Lieutenant Colonel, 1st Battalion, 1st Infantry.

a. What elements of your battalion will make up the raiding force?

b. What is your plan of reconnaissance?

c. What coordination will you make with the 2d and 3d Battalion?

A solution to the first requirement. a. Lieutenant Colonel, 1st Battalion decides that one rifle company, less its weapons platoon, can accomplish the mission.

b. Lieutenant Colonel, 1st Battalion plans to make a personal reconnaissance of the forward areas of the 2d and 3d Battalions to select routes of advance and withdrawal and to locate an assembly area and a rallying point.

c. Lieutenant Colonel, 1st Battalion coordinates with the commanders of the 2d and 3d Battalions for passage through their lines, use of their battalion rear areas for an assembly area and a rallying point, and the use of their command post and communication facilities while the raid is in progress.

Situation continued. After completing his reconnaissance of the forward areas, Lieutenant Colonel, 1st Battalion makes his plans for the execution of the raid.

Second requirement. You are Lieutenant Colonel, 1st Battalion. Select the following as part of your battalion plan:

a. An assembly area and a route thereto.

b. A route of advance to the objective.

c. A route of withdrawal.

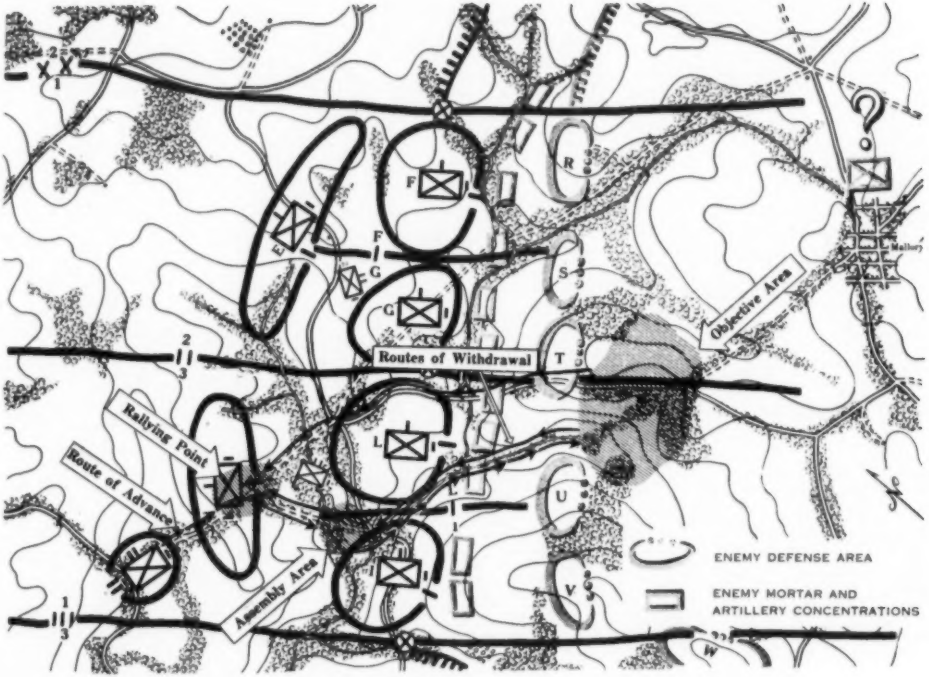
d. A rallying point (within friendly lines).

A solution to the second requirement. See Map 3.

Situation continued. Lieutenant Colonel, 1st Battalion, designated Captain, Company A as commander of the raiding force. The battalion commander oriented the raiding force commander on the mission and the battalion plan, and instructed him to reconnoiter the assembly area and the routes into the enemy lines to determine whether any road or trail blocks existed that might hamper the operation. The battalion commander directed that two rehearsals, one in daylight and one in darkness, be held prior to the operation.

The commanders of the supporting weapons units met at the 1st Battalion Command Post and made their recommendations for employment of the fires of their units.

Captain, Company A completed his reconnaissance and reported that because there were no obstacles along the


Routes of Withdrawal
Objective Area
Rallying Point
Route of Advance
Assembly Area
ENEMY DEFENSE AREA
ENEMY MORTAR AND
ARTILLERY CONCENTRATIONS

Map 3.

approach to the enemy lines, engineers would not be needed.

Third requirement. You are Lieutenant Colonel, 1st Battalion.

a. What is your plan for use of the following weapons in support of the raid?

Artillery
Heavy mortars
81-mm mortars
Supporting weapons of the 2d and 3d Battalions

b. Where will the 1st Battalion Command Post be located during the raid?

A solution to the third requirement. a. In order to coordinate the fires of the artillery, the heavy mortars, and the 81-mm mortars, concentrations will be plotted on an overlay and numbered consecutively. Copies of the overlay will be furnished to the raid commander and each observer so that supporting fires can be delivered in the minimum time. No preparation will be fired; all supporting fires will be on call.

A series of artillery concentrations will be planned along the route of advance. As the raiding force advances, the artillery will lift to successive concentrations ahead of the troops. Fire can thus be delivered on any concentration almost immediately on call. Other artillery concentrations are planned to box in the objective area, to interdict routes that might be used by the enemy to reinforce the hostile position, and to cover the withdrawal of the raiding force.

The Heavy Mortar Company will be prepared to fire on known enemy positions in the vicinity of the objective area, particularly on defiladed areas which cannot be reached by the artillery. Heavy mortar concentrations will be tied in with artillery along the routes of advance and withdrawal.

The 81-mm mortar platoon of the 1st Battalion will fire on targets as requested. The fires of the 81-mm mortar platoons of the 2d and 3d Battalions will thicken the fires of the artillery and the heavy mortars.

The other supporting weapons of the 2d and 3d Battalions will be prepared to fire on enemy positions to the front if requested by the raiding force commander.

b. The 1st Battalion Command Post will be located at the 3d Battalion Command Post during the raid so existing communication facilities can be used.

Situation continued. Captain, Company A is fully oriented on the fire control plan and is prepared to make his detailed plan for the operation.

Fourth requirement. You are Captain, Company A.

a. How will you organize the raiding force?

b. What is your plan of maneuver?

c. What means of communication will be used to control the raiding force?

d. Where will you be during the raid?

e. What time will the operation commence?

f. How will you control the supporting fires?

A solution to the fourth requirement. a. The raiding force will be organized as follows:

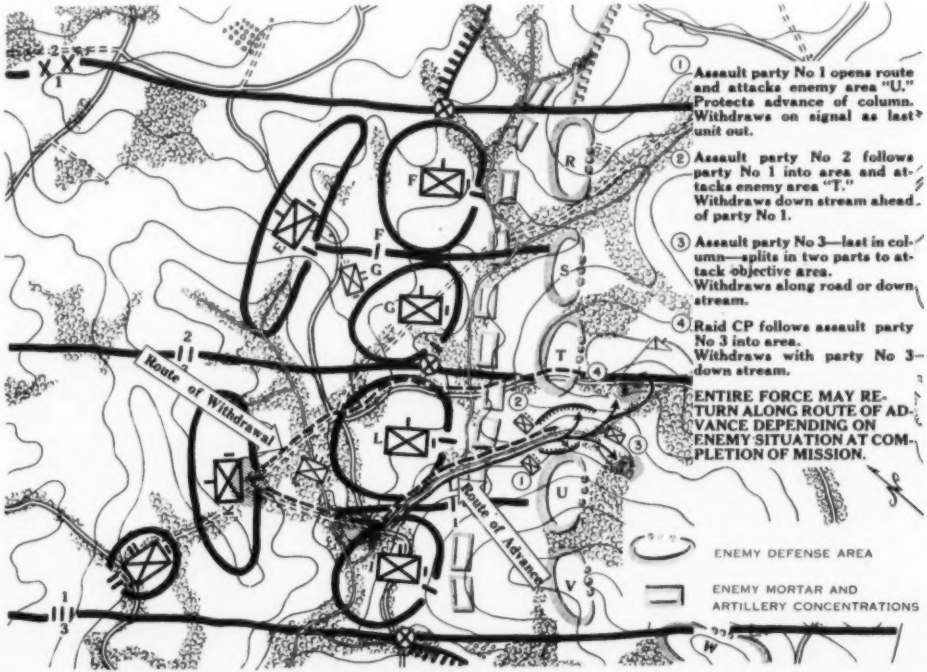
Assault Party 1	1st Platoon, Company A
Assault Party 2	2d Platoon, Company A
Assault Party 3	3d Platoon, Company A
Control Party	Captain, Company A, an SCR-300 operator, the artillery liaison officer, three artillery radio operators, one 81-mm mortar observer, three runners, and one squad from the weapons platoon to protect the control party.

b. See Map 4.

c. The raiding force commander will control his unit with SCR-300 radios. Each platoon will be equipped with a radio set of this type.

d. The control party will move into the area in rear of Assault Party 3 and establish a command post in the objective area where satisfactory radio communication can be maintained.

e. The raiding party will move out from the assembly area at 2145 under cover of darkness. The attack will be


1 Assault party No 1 opens route and attacks enemy area "U." Protects advance of column. Withdraws on signal as last unit out.
2 Assault party No 2 follows party No 1 into area and attacks enemy area "T." Withdraws down stream ahead of party No 1.
3 Assault party No 3—last in column—splits in two parts to attack objective area. Withdraws along road or down stream.
4 Raid CP follows assault party No 3 into area. Withdraws with party No 3—down stream.
ENTIRE FORCE MAY RETURN ALONG ROUTE OF ADVANCE DEPENDING ON ENEMY SITUATION AT COMPLETION OF MISSION.
Route of Withdrawal
Route of Advance
ENEMY DEFENSE AREA
ENEMY MORTAR AND ARTILLERY CONCENTRATIONS

Map 4.

timed to hit the first enemy position at 2230 when the moon first appears.

f. Captain, Company A will exercise supervisory control over all supporting fires from the raiding force CP. Artillery fire missions will be controlled by the artillery liaison officer. An observer from the Heavy Mortar Company will accompany each assault party. Fires of the 81-mm mortars will be controlled from the raid command post and from the battalion command post.

SUMMARY

This problem illustrates some of the planning involved in a supported raid. The problem is designed to show the use of a fairly large force making an attack through an enemy position by using the supporting weapons of the regiment and supporting artillery. The logical steps that are followed in planning such an operation have been drawn to promote discussion of more than one solution. The fourth requirement should prove particularly interesting as there are several acceptable solutions.

The Defense of Hofen, Germany

A Historical Monograph

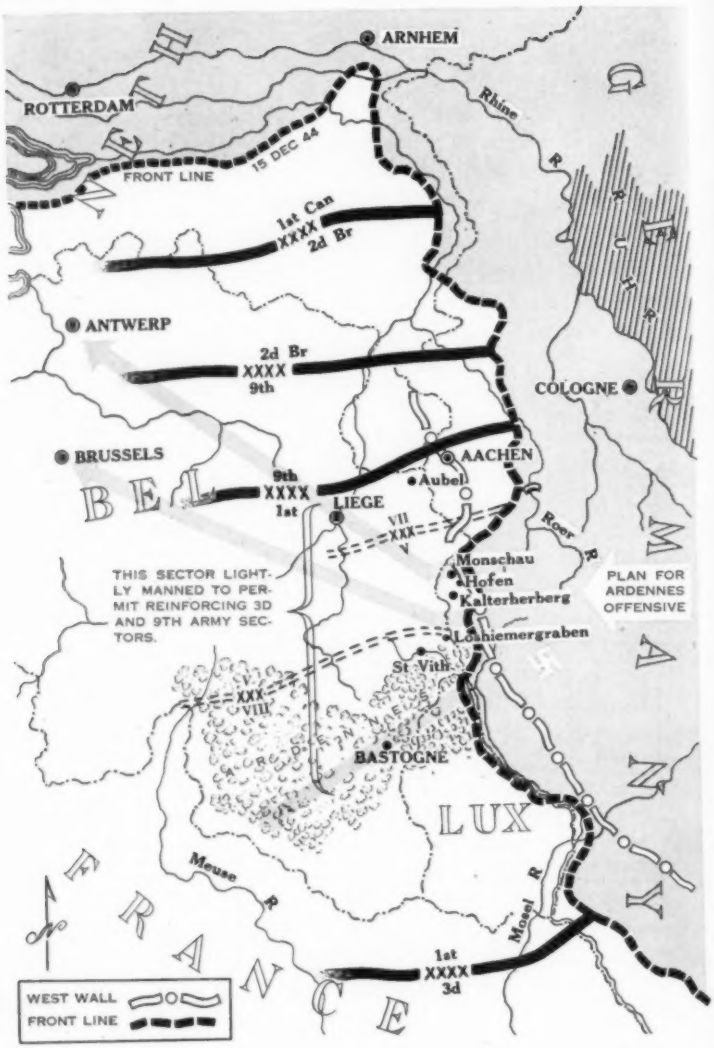
On 25 July 1944, after vicious fighting on the beaches of Normandy, the breakout at St. Lo, spearheaded by General George S. Patton's Third Army, was accomplished with results far exceeding Allied hopes. American tanks and infantry plunged through France and Belgium with such rapidity that operational time schedules were weeks behind. By September some units of the American First Army had reached the German frontier and were probing into the Ardennes Forest. (See Map 1.)

This rapid assault paid tremendous dividends in time and space factors, but it could not be sustained in the face of such obstacles as the stretching of supply lines too far for efficient operation, the depletion of supplies to a dangerously low level, and the decreased efficiency of assault units as a result of continuous attack. The Allied drive slowed to a halt before the German Westwall defenses.

The Allied High Command, in view of depleted supplies and personnel, decided to commit all forces on a general line and hold until sufficient supplies and reinforcements arrived to permit a resumption of the offensive. The plan called for continuous local attacks on the German defenses, but not on an overall basis.

During the latter days of September 1944, plans were made by the Allied Supreme Headquarters for the resumption of the attack along the First, Third, Seventh, Ninth, and British-Canadian Army sectors. The plans were twofold in purpose: first, to destroy the German forces west of the Rhine, and second, to neutralize the German industry located in the Ruhr.

The execution of this plan would require the massing of all available forces in the attack sectors. To insure success


ARNHEM
ROTTERDAM
NETHERLANDS
FRONT LINE
15 DEC 44
Rhine R.
GERMANY
1st Can
XXXX
2d Br
ANTWERP
2d Br
XXXX
9th
COLOGNE
BRUSSELS
BELGIUM
9th
XXXX
1st
AACHEN
Aubel
LIEGE
VII
XXX
V
Roer R.
Monschau
Hofen
Kalterherberg
PLAN FOR ARDENNES OFFENSIVE
THIS SECTOR LIGHTLY MANNED TO PERMIT REINFORCING 3D AND 9TH ARMY SECTORS.
Losheimergraben
St Vith
V
XXX
VIII
BASTOGNE
LUX
Meuse R.
Moselle R.
1st
XXXX
3d
FRANCE
WEST WALL
FRONT LINE

Map 1.

of this offensive, decision was made to make substantial withdrawals of troops from the Ardennes sector, leaving a minimum holding force to maintain the existing line.

It is obvious that withdrawal of troops from the Ardennes involved the taking of a calculated risk, but the reasoning behind the decision was sound and can be summed up as follows: The Ardennes Forest comprised a natural defensive barrier containing few good roads, and the Germans were known to be using the area to rest and refit their troops.

Once the decision was made immediate action was taken to implement it. During the latter part of October and early November certain troop units within the Ardennes sector were withdrawn. The remaining units were assigned wider defensive frontages and larger areas of responsibility.

99th DIVISION

The 99th Infantry Division, composed of the 393d, 394th, and 395th Infantry Regiments, was transferred to V Corps, First United States Army on 1 November 1944. The division was assigned the mission of defending the southern portion of the V Corps sector which was occupied by elements of the 5th Armored Division and the 9th Infantry Division.

The relief was completed by mid-November and the 99th Infantry Division was firmly emplaced on a front extending from Monschau, Germany on the north to Losheimergraben, Belgium on the south—a distance of twenty-one miles. (See Map 1.)

Because of the greatly extended frontage, the division commander decided to place all of his regiments on line, with the 395th Regiment on the north, the 393d Regiment in the center, and the 394th Regiment on the south. Each regiment had approximately seven miles of frontage to defend.

3D BATTALION, 395TH INFANTRY

On 8 November 1944, the 3d Battalion, 395th Inantry Regiment, 99th Infantry Division was bivouacked in the vicinity of Aubel, Belgium. At this time the 3d Battalion

was ordered to move to the vicinity of Kalterherberg, Germany, and to relieve an armored infantry unit then on line in and around Hofen, Germany.

The battalion commander alerted the battalion for movement, and immediately departed on a reconnaissance of the forward assembly area and the front line, taking with him all of the battalion staff except the executive officer.

The battalion commander and the other members of the reconnaissance party returned from their reconnaissance at 1600, and the battalion completed the movement to a forward assembly area one mile east of Kalterherberg. (See Map 2.)

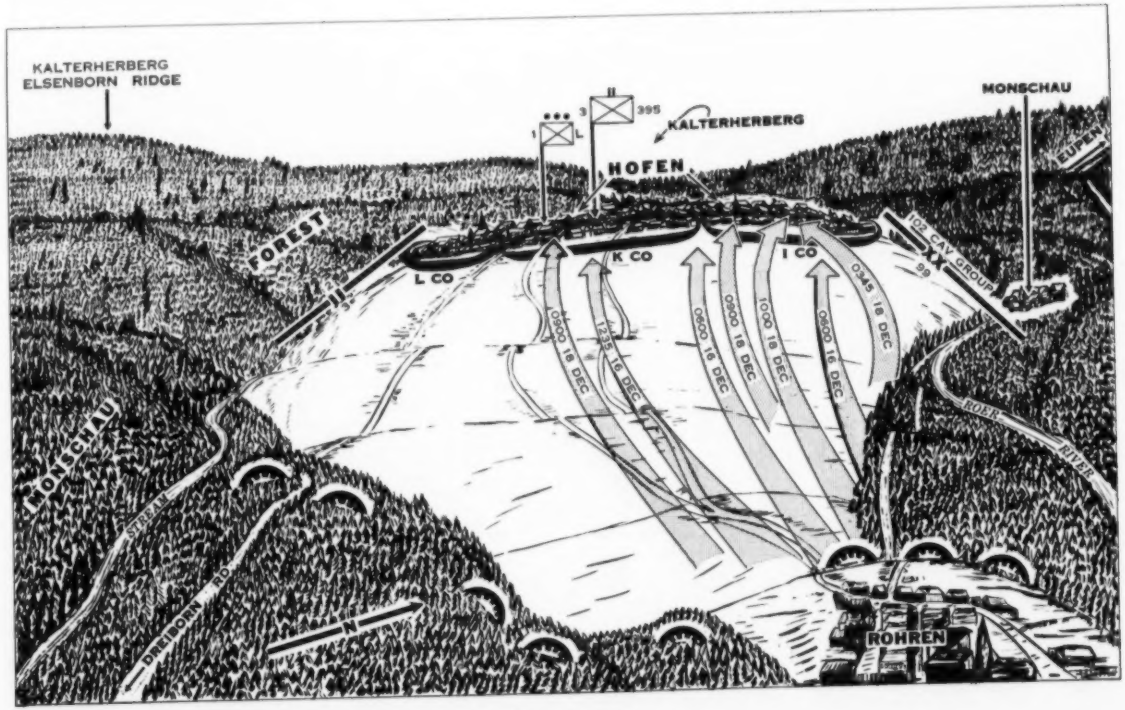
Because of the unusual nature of the terrain to be occupied, the 6,000-yard frontage assigned, and the fact that the relief was to be executed during daylight hours, all officers and key noncommissioned officers were used in making a thorough reconnaissance of the battalion defense area.

When approaching the position from the west a hill approximately 1,600 feet high dominated the approach. From a distance it appeared impossible to ascend the heavily wooded slopes. However, one secondary road led to the crest of the hill from the west where the long, narrow town of Hofen, consisting of about one hundred houses, was located.

The front-line positions of the unit being relieved were located three to four hundred yards east of the east and southeast edges of town. To the north was the town of Monschau, but it was practically invisible from Hofen, nestling as it was in the deep Roer River gorge. Approximately 2,000 yards to the east was the town of Rohren, Germany, then in the possession of the Germans.

The entire hill mass was almost surrounded by deep gorges which had been cut by the Roer River. From the front-line position could be seen the town of Kalterherberg, portions of the Monschau-Eupen Road, and part of the Kalterherberg-Elsenborn Ridge.

By 2400, 9 November 1944, plans for the relief of the armored infantry unit had been completed and every measure


KALTERHERBERG
ELSENBORN RIDGE
MONSCHAU
KALTERHERBERG
HOFEN
KUPEN
FOREST
L CO
K CO
I CO
102 CAV GROUP
XX
99
0930 16 DEC
1435 16 DEC
0900 16 DEC
1000 16 DEC
0930 16 DEC
0945 16 DEC
ROHR RIVER
MONSCHAU
STEIN
DREIBORN ROAD
N
ROHREN

Map 2.

to preserve secrecy and minimize confusion had been considered by the two commanders. Liaison was established down to and including companies, guides were provided at squad level, arrangements were made for the exchange of certain items of equipment on the position, and plans were made for the mutual use of vehicles.

The relief began at 0530, 10 November 1944. The battalion commander's plan stipulated that no attempt would be made to change the disposition effected by the armored infantry unit, and that the relief would be made on a company basis with a time interval of two hours per company.

Company I was the first to move, and by 0730 had occupied the north portion of the battalion sector. Company K then moved into the center and was followed by Company L on the south. (See Map 2.)

The 81-mm mortar platoon occupied the positions established by the mortar elements of the 15th Armored Infantry and were ready to fire as all data computed by the armored infantry mortars was readily available. Base plates were exchanged to facilitate initial registration.

Because of the extended frontage, one platoon of heavy machine guns was attached to Company K and one section was attached to the other two rifle companies. The heavy machine-gun units occupied positions prepared by the unit being relieved.

Responsibility for the defense of the assigned sector passed to the Battalion Commander, 3d Battalion, 395th Infantry at 1800, 10 November 1944.

From the beginning it was obvious that numerous changes would be necessary in the battalion defensive positions. The 6,000-yard front was manned by a thin line of riflemen and automatic weapons; organic communications were inadequate; the 81-mm mortars could not cover the front without shifting; and no reserve was held out to give depth to the position.

On 14 November 1944 the battalion commander held a staff and company commanders' meeting to outline the priority of work at hand. He emphasized the difficulty of defending a 6,000-yard front with a battalion of infantry,

and insisted that each staff officer and commander do his utmost to strengthen the battalion position. He pointed out that as the 99th Division was manning a front over 20 miles wide and as the 3d Battalion was the extreme left battalion of the division, little or no help could be expected in case of an attack.

From 14 November to 15 December 1944, maximum effort was directed towards strengthening and consolidating the battalion defensive positions. The thin line of riflemen was replaced by strong points, each consisting of a light and heavy machine gun well protected by riflemen which covered the entire front as well as the approaches thereto. The 81-mm mortar platoon had been reinforced so that it contained ten mortars, some of which could cover any point on the front.

Extensive use was made of antitank and antipersonnel mines to cover all routes of approach for infantry or armor. Additional strength was provided by placing barbed-wire entanglements in front of the defensive position.

To give flexibility to the defense, one rifle platoon of Company L was held in reserve. (See Map 2.)

From the beginning it was evident that the communication facilities of the battalion were insufficient to tie-in the battalion defensive positions now extending over a 6,000-yard front. By borrowing and improvising, a wire communication set-up consisting of fifty-two telephones of various types was put in operation. Phones were eventually installed in every strong point and observation post, enabling the battalion headquarters to keep informed on the situation at all times. Extra SCR-536 and SCR-300 radios were allotted to all companies for emergency use.

Liaison was established with the 38th Squadron of the 102d Cavalry Group, on the north, and the 2d Battalion of the 395th Infantry, on the south. Commanders and staff members of the adjacent units exchanged visits, and lateral telephone lines were strung across the front.

During this period the 3d Battalion received reinforcements that greatly added to the strength of the defensive

position. Company A, 612th Tank Destroyer Battalion (3-inch towed gun) was attached to the battalion, and the 196th Field Artillery Battalion (155-mm howitzer) was placed in direct support.

Both the German and American forces patrolled continuously. Reconnaissance patrols of the 3d Battalion ranged far and wide. Rohren and the heavily forested area in front of Companies K and L were constantly probed with little opposition, and reports indicated that the Germans were manning their front very lightly. (See Map 2.)

Initially German patrols managed to penetrate our defenses and get into Hofen, but when the battalion defensive structure was consolidated, activities of the German patrols were curtailed.

It is interesting to note that the Germans lost sixteen men killed, wounded, or captured while attempting to patrol the battalion positions during the month of November 1944. This can be attributed to the fact that every conceivable point of entrance into the defensive position was mined and booby trapped, and the battalion commander insisted that each sentinel, except those in automatic weapons emplacements, engage every enemy patrol, whether in daylight or darkness.

The results of this program were encouraging and the audacity and effectiveness of the German patrols diminished until they were practically inactive. To the best of our knowledge the Germans failed in their efforts to determine the defensive pattern of the 3d Battalion.

By 15 December 1944, practically all possible measures had been taken to strengthen the 3d Battalion position. The importance of the extensive improvements made in the defensive positions was fully realized during the pre-dawn hours of 16 December 1944.

THE GERMAN PLAN

Even during the height of the Allied push across France and Belgium, the German High Command had been devising ways and means of mounting a counteroffensive which would take the initiative from the Allies.

Circumstances favorable to a large scale German offensive did not appear until September 1944. At this time the Russian front had been more or less stabilized by counterattacking German forces; the Germans in Italy were holding firmly against Allied attacks; and on the Western Front, the British, Canadian, American, and French forces had eased to a halt before the German Westwall and were deploying along a 600-mile front.

The German plan in brief was to attack through the American sector of the Ardennes with the 5th, 6th, and 7th Panzer armies, block the shoulder of the penetration with infantry, and turn Panzer armies loose to seize crossings of the Meuse River and then to speed on to Brussels and Antwerp. (See Map 1.)

The high command believed that if the plan worked successfully, the Germans would split the Allied forces on the Western Front and would trap twenty to thirty divisions. Hitler's commanders also realized that such a sweeping counterattack, if successful, would not only set back Allied plans for a general offensive against Germany, but if all worked well, the entire Western Front might collapse and the Germans would again be on the English Channel.

On 8 October 1944, orders initiating the German operation were issued.

At 0500, 16 December 1944, in the Ardennes, the German counteroffensive smashed into the American positions with devastating results.

THE DEFENSE OF HOFEN, GERMANY

On 15 December 1944, the 3d Battalion, 395th Infantry prepared for the night in the usual manner. Nothing happened during the early hours of darkness, but at approximately 2300, outposts and front-line positions along the entire battalion sector reported hearing unusual noises in the vicinity of Rohren and the woods surrounding the town.

Artillery and mortar concentrations were fired into the reported areas until 0300, 16 December 1944. Subsequent reports from front-line units indicated that nothing unusual was taking place.

A tremendous concentration of heavy artillery, mortar, and rocket fire fell along the entire battalion position at 0525, with the heaviest concentration falling on the Company I and K areas and in and around the battalion command post, in the center of town. The fire was continuous until 0545, when it abruptly ceased.

The shelling produced an enormous amount of damage within the town of Hofen; fires raged everywhere and the streets were choked with the debris of smashed buildings and fallen telephone poles. The battalion command post was hit repeatedly and all sentries on duty were either killed or wounded. All wire lines to subordinate, adjacent, and higher headquarters were severed.

When the barrage lifted, the battalion was still temporarily stunned into inactivity, but this condition was soon remedied. Radio communication was established, wire crews were dispatched, and reports to regimental headquarters were submitted. The entire battalion was on the alert for the next move from the enemy.

At 0550 the entire front was aglow with artificial moonlight produced by Germans playing powerful searchlights against the low-hanging clouds. Commanders of Company I and K reported the lights as being favorable to the defense, as visibility to the front was increased to about 200 yards. These reports turned out to be extremely important, for the artillery forward observers had computed the general location of the searchlights and had requested permission to fire. The battalion commander, in view of the reports from the front-line commanders, refused their request.

The Germans attacked at 0600, advancing with their characteristic slow walk toward the battalion position. Their main force was centered along the boundary between Company I and K and along the left flank of Company I. Company L reported only patrol activity to their front.

The artificial moonlight outlined the approaching Germans very distinctly against the background of snow. When the German forces were within 200 yards of the battalion main line of resistance, every weapon within

range opened fire on the attackers. The sudden outburst of fire surprised the Germans and practically swept them from the front of the battalion positions.

Because communication between the artillery liaison officer and the 196th Field Artillery was out until 0615, the 81-mm mortar observers directed fire for both the artillery battalion and the mortar platoon. It was possible to use all available (ten) mortars per concentration, with devastating effect. Communication with the artillery was soon restored and the artillery observers fired their own missions after 0650.

The German losses were so heavy that at 0655 they began withdrawing. Some fighting continued around several strong points in the Company K area, but additional fire was laid down in front of these areas and the remaining enemy troops retreated to the woods in front of the battalion.

Because of the visible success of the defense the entire battalion was elated. Before the positions in the shell-marked snow, lay the bodies of over 100 German dead; 41 prisoners had been captured.

The elation was short-lived, however, for at 1235 the Germans again launched an attack of approximately company size against the Company K front. Company K was dug in along a sunken road and it was apparent that the Germans wanted the road as a flanking approach into Company I and L areas. This attack was stopped by a combination of small-arms fire and heavy concentrations of artillery and mortars.

No further attack developed on 16 December. Supplies of food and ammunition were replenished, positions were improved, casualties were evacuated, and the streets of Hofen were cleared of debris. By nightfall the battalion was again prepared. German planes strafed and bombed the town of Hofen repeatedly on 17 December, effecting heavy material damage but causing only one casualty.

Information that a powerful German attack had developed along the entire Ardennes front was not received by

the battalion until 17 December. The seriousness of the German offensive became more apparent when on the same date the battalion was attached to the 47th Infantry Regiment of the 9th Infantry Division.

The 38th Squadron, 102d Cavalry Group, on the 3d Battalion's north had almost been pushed out of the town of Monschau on 16 December and had managed to restore their lines only after fierce fighting. This was a source of concern to the battalion commander because the loss of Monschau would compromise the positions at Hofen.

At 0345, 18 December the enemy again launched an attack against the battalion position. The main effort was directed at Company I. Despite heavy concentrations of mortar and artillery fire, the enemy successfully infiltrated the lines and surrounded the battalion observation post which was located in the Company I area. Company I attacked the infiltrating force at daylight, and after considerable close quarter fighting, succeeded in killing or capturing the entire German platoon. (See Map 2.)

Beginning at 0830 on 18 December the 3d Battalion received another artillery, mortar, and rocket concentration which was more intense than the preceding attack on the 16th. At 0900 the concentration lifted and the Germans attacked, striking the Company I and K fronts, using tanks and armored cars against Company K.

On the Company K front the German infantry moved in front of the tanks and shouting like wild men, charged the Company positions. Machine guns, 81-mm mortars, 105-mm artillery, and 155-mm howitzers inflicted heavy casualties on the Germans, but they continued to advance and succeeded in effecting a penetration in the Company K line about 100 yards long. The battalion commander immediately called for mortar and artillery fires on the penetrated area. The Germans withdrew from the Company K area in disorder, and riflemen took a heavy toll as the enemy retreated. The tank destroyers were firing on the German tanks and armored cars but could not hit them because a small ridge to the front gave the German armor ample defilade. However, the German tanks and armored

cars did not attempt to move into firing position, and once the German infantry broke, they hastily withdrew. The 155-mm howitzers eventually brought them under fire and two tanks were abandoned by the Germans.

While this fighting was taking place the German forces that were attacking the Company I front succeeded in making a small penetration, but could not hold it, and withdrew.

The entire battalion front had been cleared by 0930, but only for a short time. At 1000 a force consisting of approximately a battalion of infantry attacked the center of Company I and drove a penetration about 100 yards deep and 400 yards wide. The battalion observation post was surrounded and approximately 100 German infantrymen who had moved into four large stone houses in the penetrated area were firing from the windows and doorways. Concentrations of heavy artillery and mortars were placed on the occupied houses, but as they were constructed of stone, results were negligible.

At this time the artillery sealed the entrance of the penetration with planned concentrations, and the battalion commander ordered the battalion reserve, which consisted of one rifle platoon, to move into position to contain the penetrating force. Two 57-mm antitank guns which were in position near the penetrated zone were ordered to fire armor piercing ammunition into the buildings occupied by the Germans. Within a few minutes the 57-mm guns opened fire and methodically shattered the stone walls. Riflemen of the reserve platoon fired into the windows to prevent the Germans from firing on the 57-mm gun crews.

The fire from the 57-mm guns proved effective, but the Germans did not surrender until the riflemen attacked the buildings with white phosphorus grenades and forced the Germans out.

Twenty-five badly shaken Germans were taken prisoner, and inside the buildings were found the remains of approximately seventy-five Germans who had been kilied by the fire of the 57-mm antitank guns.

This was the Germans final attempt to take Hofen; however, during the period from 19 to 24 December 1944, constant pressure was maintained on the battalion front by German raiding patrols. These forays were usually beaten off by mortar and artillery fire. The battalion prepared for another full scale attack against the position but none developed.

The 47th Infantry Regiment, 9th Infantry Division, to which the 3d Battalion had been attached, dumped huge stocks of ammunition and fortification material on the position. If the Germans had attacked again they would have found the battalion positions stronger than ever.

News of the German break-through to the south of Monschau finally filtered down to the 3d Battalion, 395th Infantry, and only then did everyone fully realize the magnitude of the German effort.

ANALYSIS

The relief of the 15th Armored Infantry (accomplished during daylight hours) was well planned and executed. Had the Germans concentrated artillery and mortar fire on the town of Hofen, they undoubtedly would have inflicted heavy casualties on the defenders while the relief was being executed, for the town of Hofen was at times overcrowded with troops.

The battalion successfully defended its position against a strong and well equipped German force even though extended over a 6,000 yard front. The continued success of the defense is attributed to the sound conduct of the defense according to accepted principles and to the intelligent use of the supporting fire power supplied by artillery, mortars, and tank destroyers.

The withholding of a reserve, although small, actually snatched victory from defeat. In this particular instance a rifle platoon was held in reserve and was instrumental in destroying the penetrating force. The mission of this small reserve was not necessarily to eject the enemy but to contain the penetrating force until fires from other elements could destroy it or drive it from the position.

The Germans initially committed their forces in a piecemeal fashion along a wide front. Such employment aided the defender immeasurably because the battalion lines were not organized for defense in depth. If the Germans had struck with a massed force against any one company front, the defense in all probability would have collapsed.

The decision to engage all enemy patrols, even during the hours of darkness, may have revealed friendly positions, but it served to disorganize enemy patrols before they gained any information of value.

The use of the 60-mm mortars in the battalion was severely restricted, primarily because the mortar crews were skeletonized to provide 81-mm mortar crews. The protective fire offered by the additional 81-mm mortars more than compensated the rifle companies for losing their 60-mm mortar crews.

Wire communication with the units on the flanks was excellent until the initial enemy barrages severed the lines. After that time, no information was obtained from either of the units on the right or left. Such a situation could have been disastrous, and immediate action should have been taken to restore communication and liaison by all possible means.

The 3d Battalion was cited for outstanding performance of duty in action against the enemy at Hofen, Germany, during the period 16 to 19 December 1944 and was awarded the Distinguished Unit Badge.

LESSONS

Some of the lessons emphasized by this operation are:

1. In the conduct of a defense protective fires by artillery and mortars are indispensable.

2. Emphasis should be placed on concealment of defensive positions and overhead cover for personnel.

3. In the defense of a wide front, strong points should be organized to cover likely approaches into the position.

4. Communications are so vital to a defense that constant efforts should be made to improve every facility available.

5. Some reserve, regardless of its size, should be provided even if front-line positions are undermanned.

6. A defensive position can always be improved. All leaders should continually supervise the improvement of emplacements and erection of obstacles.

7. Mortars should be fired in battery to obtain the most effective concentration of fire.

8. Combat fatigues men quickly, and every effort should be made to provide rest periods.

9. In case of necessity, machine guns used singly can be very effective, and their use in this manner provides more extensive automatic-fire coverage of an extended front.

10. Personnel down to and including squad leaders should make a personal reconnaissance prior to relieving a unit in the lines.

11. Elaborate use of obstacles and camouflage by the defender impedes the advance of the attacking force.

12. Patrols should be used to gain information and to maintain pressure on the enemy.

Duties of the G-3, Infantry Division

Since the beginning of warfare, commanders have relied upon individuals to assist them in making a sound and timely decision, translating it into a clear order, causing its proper dissemination, and insuring its proper execution.

These individuals—the staff officers—aid the commander by furnishing vital information upon which the commander bases his decision, by putting the order into form for publication, by interpreting it to subordinate leaders, and, as a representative of the commander, by observing its execution.

This article deals with the G-3 of the infantry division—one of the members of a group making up the commander's principal assistants.

Command functions in the infantry division are concerned with four general divisions; personnel, intelligence, operations and training, and supply and evacuation. Within the general staff organization, the division commander has staff officers to assist him in these command functions. The G-1's activity is centered on matters pertaining to individuals or personnel; the G-2 deals with intelligence; the G-3 is concerned with organization, training, and employment of units; and the G-4 specializes in supply and evacuation. These functions often overlap, and each staff officer is concerned with what the other does. Because all members of the command put their combined efforts into the accomplishment of the commander's mission, it follows that there must be coordination of effort as well as a division of labor.

The general principles of staff work apply to the G-3 as well as to the other staff members. Although the G-3 assists the commander in the employment of units, he is not in the chain of command. The division G-3 neither commands the S-3 of the regiment, nor does he look to the G-3

of the corps for his instructions. However, based upon command directive or policy, the G-3 interprets the commanding general's intentions for subordinate commanders.

ORGANIZATION OF THE G-3 SECTION

The G-3 is primarily concerned with organization, training, and combat operations. To assist him in these duties, he has a section organization for which he is responsible. The

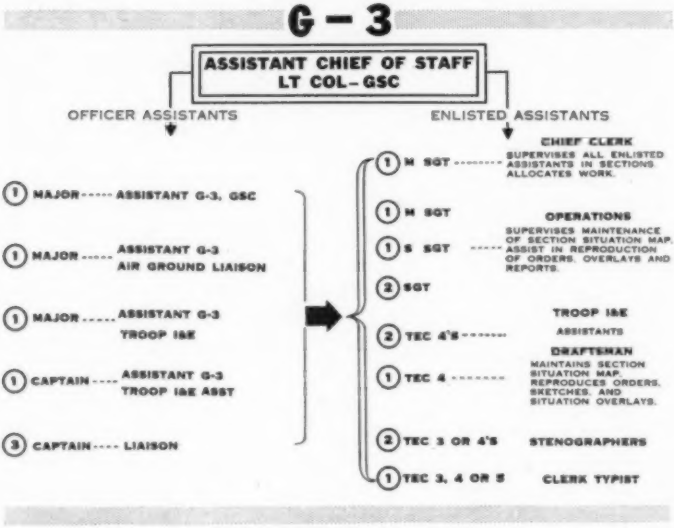

G – 3
ASSISTANT CHIEF OF STAFF
LT COL – GSC
OFFICER ASSISTANTS
ENLISTED ASSISTANTS
(1) MAJOR ----- ASSISTANT G-3, GSC
(1) MAJOR ----- ASSISTANT G-3 AIR GROUND LIAISON
(1) MAJOR ----- ASSISTANT G-3 TROOP I&E
(1) CAPTAIN ---- ASSISTANT G-3 TROOP I&E ASST
(3) CAPTAIN ---- LIAISON
(1) M SGT ------- CHIEF CLERK
SUPERVISES ALL ENLISTED ASSISTANTS IN SECTIONS. ALLOCATES WORK.
(1) M SGT
(1) S SGT ----- OPERATIONS
SUPERVISES MAINTENANCE OF SECTION SITUATION MAP. ASSIST IN REPRODUCTION OF ORDERS, OVERLAYS AND REPORTS.
(2) SGT
(2) TEC 4'S ------ TROOP I&E ASSISTANTS
(1) TEC 4 ------- DRAFTSMAN
MAINTAINS SECTION SITUATION MAP. REPRODUCES ORDERS, SKETCHES, AND SITUATION OVERLAYS.
(2) TEC 3 OR 4'S STENOGRAPHERS
(1) TEC 3, 4 OR 5 CLERK TYPIST

FIGURE 1.

organization of the G-3 section of the infantry division as used at The Infantry School for instructional purposes is shown in figure 1. While modifications may be made periodically in tables of organization and equipment, the principles of this organization will continue to apply. To provide 24-hour operation of the command post, the commissioned and noncommissioned personnel are organized into shifts. The G-3, however, does not adhere to any fixed regular shift of duty. It is vital for him to be free at any

time, either to make visits to the units of the command, or to accompany the commander.

Duties of the operations and training section lend themselves to logical subgroupings. (See figure 2.) The need for decentralizing duties to assure close supervision is especially desirable in headquarters of divisions and higher organizations. Flexibility within the G-3 section must be such that personnel can work on the function which is most important at a given time.

FUNCTIONAL GROUPING OF THE OPERATIONS AND TRAINING SECTION

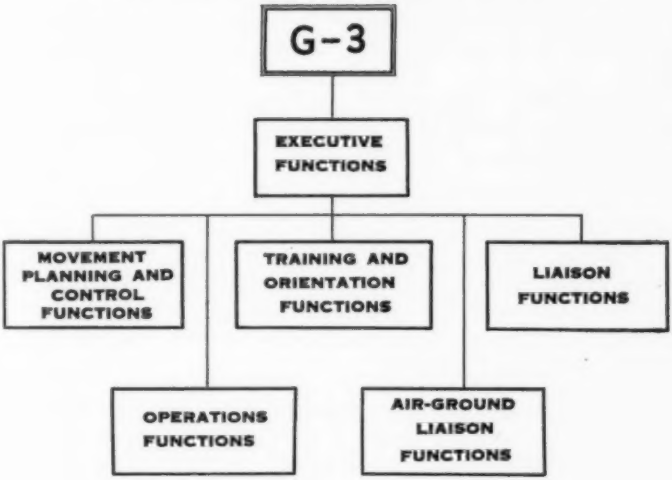


FIGURE 2.

The *executive functions* comprise the administrative operation of the section and responsibility for its movement, installation, and general operation. This also includes the reproduction and distribution of orders and the preparation, reproduction, and distribution of reports.

The *operations functions* embrace the war room or operations center—including posting the situation map.

The *training and orientation functions* includes all training matters such as preparation of programs; allocation of training areas, ammunition, and facilities; establishment of schools; allotment of students to schools; and orientation of troops on matters of military and political policy.

The *movement, planning, and control functions* deal with troop movements. This includes times, routes, transportation requirements, and control. To assure proper coordination of troop movements, close liaison is maintained with other staff officers. The provost marshal makes recommendations on control and supervision; the division engineer furnishes road information; and the G-4 indicates availability of transportation.

The *liaison functions* include operation of the visitors' information section and control over the duties of liaison officers. The organic liaison officers usually function in a liaison capacity with higher and adjacent headquarters. If they are not required on this mission, they perform duty within the section.

The *air-ground liaison functions* include furnishing army with information on the progress of the ground battle, and submitting reports on changes in the locations of ground units. This liaison group also consolidates and forwards to army information required to formulate air requests, and it keeps appropriate ground commanders informed as to the action on these requests.

ORGANIZATION

The G-3 is concerned with units. It is his duty and the duty of each member of his section to understand thoroughly the organization and capabilities of all the division units. In addition, they should understand the organization and capabilities of units which are likely to support the division.

The adequacy of tables of organization and equipment is constantly studied by the operations officer. Prior to making recommendations for changes, he should visit the subordinate units and talk with the commanders to secure their views on the adequacy of personnel and equipment.

Because he plays such a large part in the operational task planning, the G-3 recommends modifications in organization of units to facilitate accomplishment of a particular mission. The task of organization does not cease with activation of the unit; it is a continuing responsibility requiring concentration and a complete knowledge of the unit's tactical capabilities.

Organization for movement also requires attention of the operations and training officer because he is the one who recommends what units should move and how they should move. The necessity for modifying the organization of units to cope with special situations was of such great importance during World War II that G-3 subsections were organized in many higher headquarters to take care of this problem.

TRAINING

From the commander, the G-3 receives the training directive—a training order which establishes the policy under which the division will be trained. It is usually given in general terms which state the objectives and the amount of time available for the training period. The directive avoids establishing details for subordinates, but it may emphasize certain standards and subjects which are to be included in the programs of the subordinate units.

The G-3 makes a continuous estimate of the training situation, and this forms the basis for preparing a training program that fixes the subjects to be taught and indicates their sequence of presentation. This program denotes the operating agencies and establishes controls over training to guide subordinate units, but it does not fix the time, place, and scope of daily work. The daily work scope is indicated in the training schedules published by the subordinate units.

Before the division training program is put into effect, the G-3 and his section provide and coordinate training areas, firing ranges, equipment, and other training facilities. The G-3 should approach this problem from the angle of making training as attractive as is consistent with effective instruction. He does this through the careful selection and

rotation of training areas and sites. The G-3 coordinates with the G-4 and special staff officers on requirements for materials, the construction of the ranges, and the supply of equipment. In selecting training areas and sites, the G-3 considers their distances from the unit area. In planning for economy of time, he decides whether the unit should bivouac in the training area for the duration of the period of its training, or whether it should be transported daily in trucks.

Training aids are allocated to subordinate units by the G-3. They should be catalogued and accounted for in a systematic manner. In addition to making training aids available, the G-3 disseminates information which will encourage subordinate units to construct their own training aids. He is also familiar with the available training films, film strips, and the various types of projectors. Operation of an efficient training aids library insures timely distribution of these aids to the units.

The success of the training period probably depends upon the results of the division school system. The operations and training officer is concerned with schools for both instructors and specialists, and with plans for other types of training which are conducted under centralized control. This includes the schooling of officers during so-called off-duty hours, so that they can stay ahead of the training schedule. After training directives are issued, the G-3 exercises staff supervision to insure that the commander's objectives are understood and carried out. Continuous supervision is accomplished by means of training reports, inspecting officers, and personal inspections by the G-3.

A specialized operation, such as an amphibious movement, requires a separate division training program. In organizing such a program, the G-3 selects terrain which closely resembles the target area, and he establishes liaison with the units which are to support and cooperate with the division.

In addition to planning the training for division units, the operations and training officer is responsible for training his own section. To perform efficiently the many duties assigned this section, his assistants must be capable, intelligent, and diligent. The G-3 carefully analyzes the detailed duties assigned to each subordinate to insure that the duties are within the capabilities of the individual. The duties include preparing operation maps and orders, records and reports, and sketches; posting situation maps, and drafting.

Training never ends within the infantry division. It is conducted prior to battle, concurrent with combat operations, and after the completion of a phase of combat. The G-3 prepares a future training program to correct current battle mistakes, even though the unit is still engaged in combat operations.

The goal of the information and education program is to make the American soldier the best informed soldier of any army. Staff supervision for the conduct of an effective information and education program is a G-3 function. There is an information and education officer within the G-3 section to assist in this duty, but the G-3 retains the responsibility. An effective program can be developed by coordinating the actions of subordinate units to assure that they receive information on timely topics and pass this on to the individuals.

COMBAT OPERATIONS

The training mission is directed towards preparing the unit for combat operation. During combat operations, the G-3 makes a continuous study of the tactical situation—considering both the enemy forces and the capabilities of his own units. The first consideration is the enemy situation and order of battle, on which he closely coordinates with the intelligence officer. Factors which affect the use of our own troops are the disposition of enemy troops, their location, their state of morale, and the types of units. In some instances, because of the characteristics of their activities and their commanders, enemy units have been known

to become typed. The enemy information has a definite effect upon the recommendations that the G-3 will make concerning the employment and organization for movement of friendly troops.

Instructions from higher units is the second consideration affecting the G-3's study of the tactical situation. The G-3 must maintain close liaison with higher headquarters in order to receive timely hints as to coming operations. His initial planning should be sufficiently flexible to cover any instructions.

The proposed employment of adjacent or supporting units constitutes the third condition affecting the situation study. All of these three factors—enemy capabilities, instructions from higher headquarters, and employment of friendly elements—have a vital bearing on the G-3's recommendations for the place of attack, the formation for attack, and the size and location of the reserve.

The G-3 must be able at any given time to furnish an estimate of the capability of a particular unit, or the capability of the division as a whole. As a planning aid, the G-3 keeps an up-to-date troop list and an operation map. The nature of the terrain and the time it will take to move units to given points affect the timing of an operation, the tactical plan, and the order in which units will be employed.

The morale of the troops is considered during the situation study. Questions on personnel, which include mental, physical, and moral condition, are answered in collaboration with the G-1. Here, among other things, the G-3 considers the experience of the troops, the type of previous duty they have performed, the length of time they have been in the theater, the length of time they have been in battle, the quality of leadership in the units, and finally the number and types of supporting units. Collectively, these factors determine the capabilities of the troops and form the basis for recommendations concerning the unit's present and future tactical employment.

In his situation study, the G-3 considers the effect of casualties and replacements. He analyzes past accomplishments of the unit and compares their casualty rate with

the rates for other units that have been in the same type of fighting on similar terrain and engaged against an enemy of the same relative strength and ability. Where casualties are thus compared between units, what at first appeared to be excessive losses may turn out to be reasonable. If casualties are considered excessive, the reasons are determined; they may be due to inadequate supporting artillery or armor, weakness in the training of the individual soldier, the lack of competent leaders, or faulty staff planning. The G-3 should provide the commander with intelligent information on the question of casualties and make suitable recommendations for reducing combat losses. The G-3 coordinates with the G-1 on securing replacements and assigning them to the organizations where they are most needed. In dealing with unit requirements and combat priorities for personnel, the G-3 provides the answer to where and what type of men are needed. Frequently the replacements require additional training and this is a responsibility of the G-3.

In his continuous study of the situation, the G-3 coordinates closely with the G-2 who supplies information of the enemy, weather predictions and terrain information. The physical structure of terrain affects both the time and the space factors in troop movements as well as determining the physical condition and morale of the troops when they reach the enemy. In recommending boundaries, the G-3 must employ terrain to his unit's advantage, and he should understand its effects upon offensive, defensive, or delaying types of action.

In a similar manner, weather affects the types of transportation to be used, and the time and space factors involved in troops movements. Extremes of weather—cold, hot, or wet—greatly affect the fighting ability of the individual soldier. On occasions weather even dictates the type of equipment to be used and the type of clothing to be worn.

Experiences show that operations have little chance for success unless they can be adequately supported by supply agencies. Therefore, the G-3 coordinates the development of

of his plans with the logistics officer. At the earliest date possible the G-3 furnishes the G-4 with information on future operations and indicates the required critical items of equipment. It then becomes a G-4 function to secure these items. The G-4, after a thorough study of the operations plan, indicates whether he can support the projected operation with the available supply, transportation, and road facilities. Many times the G-3 and G-4 must compromise in order that supply measures can support the operation. This give and take relationship within the division staff is supervised by the chief of staff.

From the ammunition credits allocated to the division, the G-3 recommends the amount and types to be drawn. It is logical for him to do this because he has done a major portion of the operational planning and his estimate has considered the type of fighting, the probable length of the operation, and the other factors which have a direct bearing on ammunition requirements.

Another G-3 responsibility is that of preparing estimates, reports, and recommendations based upon the tactical situation. The estimate of the situation is an analysis of a set of circumstances to determine the best course of action and present that line of action in a clear, easily understandable form. Information pertinent to the assigned mission is studied and analyzed by the G-3 as a basis for making recommendations to his commander. The difference between an estimate by the G-3 and the commander lies in the principle that the G-3 arrives at a recommendation, whereas the commander arrives at a decision. The substance of the estimate itself remains unchanged—there being only a difference in the technique of presentation. The G-3 considers all elements of information, while the commander has the privilege of discarding those elements which he feels do not come into the picture at this time. The estimate of the situation is a continuous process.

The G-3 organizes his section and maintains pertinent information available in a suitable form so that the commander can be briefed at any time. During the war, the

problem of clearly presenting information to the commander brought about the establishment of the war room or joint operations center. (The war room will be discussed at the end of this article.)

RECORDS AND REPORTS

Staff records are maintained to prepare estimates and plans, to prepare reports to higher headquarters, and to prepare historical records. One of the important things that the G-3 must learn is the need for these records being adequate and correct.

The *G-3 journal,* supervised by the operations officer, is a chronological record of important events affecting the staff section. It is a permanent record of the unit's operation, and it is annexed to after action reports. The journal is either closed daily or it is closed at the end of a phase or period, whichever is determined by higher authority. In units the size of a regiment or battalion only one combined staff journal is maintained.

The *periodic operation report* is prepared by the G-3 section. It is rendered for periods prescribed by the next higher headquarters and contains, in general, those items which would be of special interest to the higher headquarters. Each report reflects the present situation; the changes that have occurred during the stated period; and the conditions beyond the control of the unit, existing or anticipated, which will affect adversely the operations of the staff section or unit. In the regiment and battalion, where a single unit report normally is prepared instead of a separate one for each staff section, it is sometimes the duty of the operations officer, under supervision of the executive officer, to consolidate the data from other staff officers and prepare the report for the commander's signature.

Special reports, prepared or forwarded by the G-3, cover unusual or irregular events, and may be called for by the higher headquarters or initiated by the subordinate headquarters.

The G-3 retains copies of records of permanent value so long as they are of use in his work. When he is finished

with the records he turns them over to the division adjutant general. As a matter of permanent record, a copy of each official report is forwarded to The Adjutant General, Department of the Army, Washington, D. C.

The G-3 worksheet is a personal notebook in which the operations officer makes entries which afford him a consolidated source of information for preparing the periodic report and other staff reports. The G-3 indexes his notebook and posts such data as he deems appropriate. It is not an official record.

The journal, operation report, worksheet, and the situation map, form a depository for the items of information required by the operations and training officer to brief, at any time, his commander or other interested parties.

ADDITIONAL STAFF FUNCTIONS

Designating the general areas for bivouacking, quartering, and staging division units, is a G-3 staff responsibility. When the G-3 receives a movement directive, he plans that the arrangement of bivouac areas will facilitate the plan of operation. He does not specify the area for companies, batteries, and similar units; instead, he allocates general areas for the next subordinate units within the division.

Coordination of reconnaissance measures pertaining to the commitment of our troops into offensive or defensive combat is a G-3 staff function. The G-2 coordinates with the G-3 on the use of ground combat troops for reconnaissance missions. It is logical that supervision of reconnaissance measures rests in one single section; for coordination is necessary with subordinate units, adjacent units and units of higher headquarters. The G-3 must realize the need for personal reconnaissance of the area of operation. He should get out on the ground and see where the live bodies of his command are going to be ordered and not confine his reconnaissance to a map; making broad blue sweeping arrows over hill and dale into the objective. When he has seen for himself what the terrain looks like from the eyes of the soldier, the G-3 can go to his commander with

positive information that will aid him in directing the battle.

Troop movement planning is a major job of the G-3 and his section. Again, his planning is directed toward what the unit will do when it reaches its destination. In any movement, the main factors to be considered are time, space, and the availability of transportation. Where is this unit going? When must it be there? How is it going? These are all questions that the G-3 considers. After the G-3 has become familiar with his unit, he can prepare standing operating procedure methods or troop movement tables to fit any mode of travel—foot, motor, train, ship, or plane. These tables can be modified at any particular time to conform with the strength of the command and the number of units being transported. Frequently the G-3 may be ordered to prepare moves utilizing only organic transportation; at other times, he may have reinforcing transport. Close coordination with other general staff and special staff officers is vital. In troop movements very close coordination is required with the logistics officer on the selection of routes, and the availability of additional transport for the movement of supplies. The division engineer aids the G-3 in reconnoitering the status of roads and bridges. The G-2 furnishes weather forecasts. In his transportation plans, the G-3 considers movement by foot, by motor, by rail, by boat, and by air. The movement of troops by air requires no change in basic staff duties, but it does add something different to the technique of planning and supervision. Weather influences both the timing as well as the type of transportation that can be used, and must be considered carefully.

In making *tactical recommendations for employment of units*, the G-3 closely coordinates his planning with the other staff officers. The G-4 furnishes the supply and evacuation plan, the G-2 the enemy capabilities, and the G-1 the effect of troop morale. After the G-3 has secured staff recommendations and completed his estimate, he should

again coordinate with the G-4 to verify the logistical support. If the G-4 cannot support the operation as it is planned initially, additional supplies must be procured or the plan must be altered.

Enemy capabilities and the relative order for employment of the lines of action open to the enemy are secured from the intelligence officer. Enemy dispositions and the state of morale of the enemy troops are vital factors which influence the G-3 recommendations for the tactical employment of friendly troops. Based upon these enemy factors, and considering his unit's morale, the G-3 recommends formations, strengths, location of reserves, numbers of supporting troops, and timing. If the G-3 sees certain objections to the commander's plan of action, he should state the objections and recommend a solution. In this manner he will be keeping the commander fully advised of all contingencies.

Coordination and supervision of requests for air missions are the G-3 responsibilities; however, he coordinates with the intelligence officer on requests for reconnaissance missions. The G-3 section is authorized a major, air-ground liaison officer, who is trained in air-ground operation and acts as advisor on air matters to both the G-3 and the commanding general. This officer should know the types of planes and their capabilities, as well as the types of bombs and their effectiveness. This technical knowledge is applied by the G-3 in planning or coordinating air missions in support of the division. To facilitate communication, the division has a direct line to the army air-ground operations center and makes its air requests direct to the army, although they may be monitored by the corps.

Highly mobile warfare, as conducted by our enemy in World War II, dictated the necessity for *defense of administrative installations and lines of communication.* The G-3 is responsible for the overall division defense plan and for the use of combat troops. The defense plan includes measures for the defense of the administrative installations and the lines of communication, as well as for the forward areas of the combat zone. Infiltration tactics and the presence

of parachute troops requires this planning. In the Pacific it was learned early that carrying parties and stable installations, such as hospitals and supply dumps, required protection. Defense of the administrative installations lends itself to inclusion in the division standing operating procedure, which is written by the G-3.

Coordination of those engineer activities relating to the tactical mission is a G-3 responsibility. The engineer is the expert on how to accomplish his mission; the details of where and when he does this work are controlled by the commander through the G-3. Coordination of the engineering plan is accomplished at conferences between the engineer and the G-3. Engineer questions include what type of fortifications are needed, and where they are to be located. If there are to be mine fields, where are they to be laid or breached? Where and when will the ferrying or bridging equipment be brought up to support the division in river-crossing operations? As the operational planner, the G-3 must have the answers to these and other questions. It is his job to make the engineer plan a part of the operation plan. The G-3 coordinates with the logistics officer on the allocation of engineer assignments. This is necessary as the G-4 requires considerable assistance from the division engineer units in carrying out the division supply program.

Commanders strive to provide tactical measures which will mislead the enemy as to the true intentions of the unit. These measures must preserve secrecy and effect surprise yet achieve realism. The G-3 supervises these measures and does everything possible to see that they are carried out in a realistic manner which will convince the enemy that the diversionary effort is the main effort. Plans for secrecy and surprise include such principles as: artillery built up over a period of time instead of suddenly; actual troop movements to confuse the enemy; and the construction of dummy positions and dummy materiel dumps. It must be stressed that any plan intended to deceive and gain surprise requires realistic execution. Security measures are necessary in order to provide for success of the operational plan, and close coordination with the intelligence officer is required on counterintelligence matters.

A G-3 or S-3 should frequently visit the units in the field. He must become personally acquainted with their commanders and maintain close contact with them. He listens to the commanders and transmits their ideas to his commander. He must keep in mind the fact that the subordinate commanders are under great stress and that they are the ones who are doing the fighting. If the G-3 conducts himself properly, he can do much towards creating a good feeling between the commanders of the subordinate units and the staff. In addition, this personal knowledge of unit capabilities will help when the going gets tough and he is asked to evaluate unit capabilities.

Control of liaison personnel and liaison activities within the division is the staff responsibility of the G-3. There are two principles which he should follow; first, completely understand the duties of the liaison personnel and how to brief them correctly; and second, thoroughly brief the liaison personnel on their duties before they leave the headquarters. He supervises actions of the liaison officers—including preparation of their reports. The G-3 is also responsible that liaison is established with adjacent units and higher units. In coordinating liaison activities, the G-3 should be certain to keep liaison officers of other units who are present in his headquarters advised of the situation.

In *planning for the operation*, it is a G-3 responsibility to provide for adequate signal communication. This is a very important function because a commander lacks control over an operation until he has established communication to all subordinate units of his command. The division signal officer and the operations and training officer conduct conferences to insure that the signal communications plan will support the operation. The G-3 also realizes the need for training communication personnel, who are included with division headquarters elements for training. Technical communication training can be accomplished through special schools, by close supervision in command post exercises, and by maneuvers.

The general locations of the division and principal subordinate unit command posts are carefully selected. The

division command post is the nerve center and control vehicle for the operation as a whole and it should be located so as to facilitate control of subordinate units. If the commanding general or the chief of staff does not designate a general area for the location of the command post, the G-3 recommends the location. After the general command post location has been designated, it becomes a G-1 function to handle the specific arrangement and assignment of space.

One of the important G-3 jobs is *transmitting clearly the commander's orders.* Under direction of the chief of staff, the G-3 is responsible for coordination of staff work in writing the order and assembling it (complete with annexes), authentication, distribution, and supervision of its execution. The G-3 section personnel should be so well trained that, based on the G-3's notes, they can produce a complete, clear, and timely order.

At the conclusion of the commander's directive, the G-3 should immediately issue a *warning order.* In assisting the commander, it is necessary that the G-3 supervise the execution of orders. He should stay in contact with the situation at all times in order to keep his orders abreast of developments. Control deteriorates when one order covers too long a period of time; consequently, the G-3 is constantly preparing fragmentary orders.

Operation maps and overlays simplify, clarify, and expedite field orders. They serve as a means to portray graphically the location of troops and indicate the proposed operations. The G-3 coordinates with the G-2 to obtain enemy information and he checks with the G-4 for logistical data. The G-3 and his section, through effective organization and proper employment of maps and overlays, can do much to reduce the interval between the time the commander issues his directive and the time it is received by the subordinate commanders. During the past war, the participation of partisan and guerilla troops made it necessary that their actions be confined to a particular zone of operation and coordinated with the operational plan of regular units. Before recommending employment of partisans or guerillas,

the G-3 should clear with the G-2. If such employment is decided upon, the G-3 recommends a definite objective for these forces and intergrates their use with the operation of the regular unit. Indiscriminate wanderings by partisan or guerilla units will do little more than attract the attention of the enemy. However, if these units are organized, they can blow bridges behind the enemy position, disrupt his supply lines, raid enemy camps and installations, and hold important defiles or bridges for our advancing troops. Guerilla or partisan elements which are properly oriented and carefully employed can materially contribute to the unit's success.

Planning is a major task of any staff officer and that certainly holds true for the G-3, since he must constantly prepare plans covering future tactical operations. Planning is a continuous process and the larger the unit the greater the necessity for anticipating future action and transposing this action into tangible plans. As a result of the estimate of the situation, the commander issues a directive to his staff which includes the object of the operation, its nature, the size and composition of the force, the approximate target date, and the date when planning should be completed. In planning, the G-3 coordinates closely with the staff officers of other commands who are being included in the operation. The commander may have a special planning staff set-up in the division, or he may direct that the plan be devised concurrently during execution of other prescribed duties of the G-3 and his section. Upon completion of the planning the G-3 supervises the preparation and issuance of the operation order or letter of instruction.

WAR ROOM

The operations and training officer, in coordination with the G-2, is charged with the responsibility for the operation of the war room. Establishment of a war room is perhaps the most significant innovation in command post technique developed during the last war. It owes its birth to the various commanders' dissatisfaction with the necessity for wandering about their command posts from one section

to another to conduct operational business. This condition was corrected by the establishment of the war room—usually a single room or tent which served as a focal point for all command and staff functions.

One unit effectively conducted operations from the war room or joint operations center in the following manner. The G-2 and G-3 sections provided operational personnel which were augmented by additional enlisted personnel from division units or staff sections. The signal company revised its wire system to provide special circuits into the war room. In addition, circuits from a special monitoring switchboard in the war room were connected with the commanding general, the assistant division commander, the chief of staff, the G-2 and G-3 sections, and the G-2 and G-3 individually. The large volume of administrative calls that were sent out and received required the G-4 and G-1 sections to be connected with the main switchboard. Each staff section maintained a situation map in the war room. Artillery and engineer liaison officers were on call and maintained in the war room appropriate artillery maps, range charts, road maps, and bridge status diagrams.

A roster of duty officers was maintained to insure operation on a 24-hour basis. The duty officer was responsible for the posting of all maps, for briefing on the latest situation, for disseminating information to subordinate units, and for informing the commanding general and appropriate staff officers of important occurances. He was further charged with the supervision over the preparation of the journal—the permanent record of the division's activities.

One or more stenographers, on continuous shifts, monitored all calls in and out of the war room switchboard, made copies of the messages or the orders, and posted them in the journal. All written orders and reports were added to this journal so that at the close of a 24-hour period, a complete record of the activity of the command was contained in one document. The operational function of the G-3 and other sections was conducted in another place.

By concentrating all operational data in one location, the war room affords the commander with information upon

which to base his decision and conduct successful operations.

SUMMARY

The G-3 of the division assists his commander in deciding what the units are to do, in ordering them to perform what has been decided, and in the supervision of the performance. He provides this assistance through the assembly of necessary information, by making a detailed analysis and study of this information, by recommending action to his commander based upon his study, by taking the decision of the commander and putting it into orders, by dis-- seminating these orders, and supervising their execution.

Attack of a Fortified Position

Experience indicates that any fortification can be breached by an attacker who has the means to do so and is willing to pay the price in men and materiel. Early in World War II the Germans breached the Maginot and Mannerheim lines with comparative ease. When the Allies later took the initiative they penetrated the fortifications in Normandy and later breached a gap in the Seigfried Line.

The fact that an area is fortified indicates that it is vital to the defender and consequently, that the defender will attempt to maintain the integrity of the position with every means at his disposal. The special problem of the attacker is to determine where the position can best be breached and what weapons can be brought to bear on the position to lessen the cost in men and materiel. As in other special operations the basic principles of the attack are unchanged but the application of the principles must be altered to fit the special situation—to attempt to penetrate a fortified position on a broad front, as in the attack of a river line, invites disaster or failure.

ANALYSIS OF A FORTIFIED POSITION

A fortified position is a defense area which contains numerous steel and concrete works. According to its extent and depth, the position is classified as a fortified locality, a fortified line, or a fortified zone. The defensive works usually consist of fortified weapons emplacements, protected troop shelters, entrenchments and obstacles. Major zones of permanent fortifications include strongly organized groups of emplacements, shelters, and other underground installations.

The flanks of a fortified position are generally secure as they are usually anchored on some terrain obstacle. Consequently the isolation of this position by ground envelopment is usually impossible, and it must be reduced by a direct attack which breaks through at a selected point. The break through is followed by an envelopment of the shoulders created by the penetration.

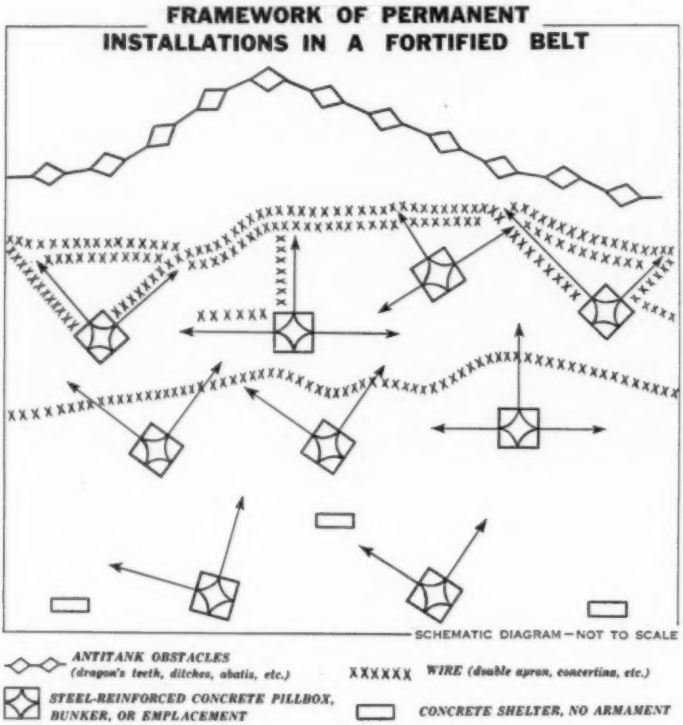

FRAMEWORK OF PERMANENT INSTALLATIONS IN A FORTIFIED BELT
SCHEMATIC DIAGRAM—NOT TO SCALE
ANTITANK OBSTACLES (dragon's teeth, ditches, abatis, etc.)
WIRE (double apron, concertina, etc.)
STEEL-REINFORCED CONCRETE PILLBOX, BUNKER, OR EMPLACEMENT
CONCRETE SHELTER, NO ARMAMENT

FIGURE 1.

Fortified positions are organized in depth and for all-around defense (see figure 1). Emplacements are sited to fire in one or more directions and usually leave one or more blind sides. These, however, are effectively covered by

coordinated fires of other emplacements and by antipersonnel mine fields and cannot readily be approached without action to restrain the supporting fires from other emplacements. Machine guns within the emplacements are sited to afford interlocking bands of grazing fire. Dead space in these bands of fire is covered by antipersonnel mines, by artillery or mortar fires, or by fires of individuals. The defender can be expected to supplement these fires with close-in air support.

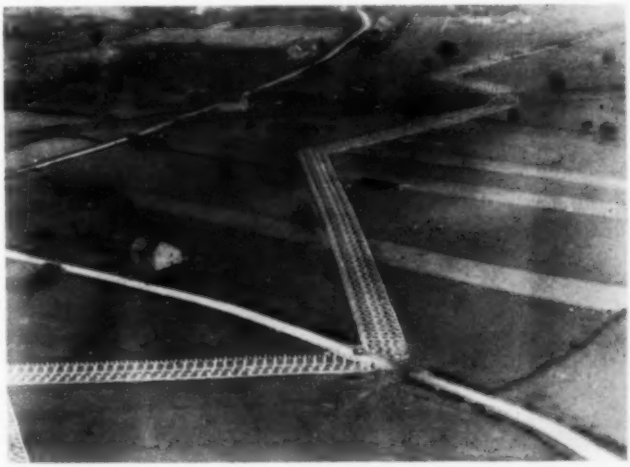


FIGURE 2. Dragon's teeth in front of the Seigfried Line.

Tank obstacles, natural or artificial, extend along the entire front of the fortified position. Man-made obstacles consist of dragons' teeth, tank ditches, or similar obstacles, covered by antitank fire. Antitank mine fields may also be expected, especially in likely avenues of advance for armored vehicles. They are usually laid out in an irregular formation and in great depth.

An elaborate communication system is established within the fortified position; individual bunkers, observation posts, troop shelters, and supporting high angle of fire weapon positions are connected by an underground wire

system. In more extensively fortified zones these installations are connected by a series of communication trenches or tunnels.

Emplacements for machine guns and antitank weapons are the basic installations in a fortified position. Each emplacement has one or more embrasures from which the guns are fired, and includes ample protected space for the crew and ammunition. It may also provide living quarters for the crew. Such emplacements are commonly constructed of reinforced concrete, but in some cases are made of steel.

FIGURE 3. Tank ditch.

Protected gun emplacements are generally referred to as bunkers. The walls of concrete bunkers may be five to ten feet thick. The use of sandbags and plastic or metal coverings inside and outside of the walls limits the chipping of concrete. To prevent small-arms fire from ricocheting into the embrasure, the sidewalls of the embrasure are constructed similar to ordinary stairs. Most embrasures provide a field of fire of about sixty degrees; however, the

wider the angular opening of the embrasures, the weaker the concrete surrounding the embrasure. Heavy steel shields which can be opened or closed from inside the emplacement may be used to cover firing ports. The number of embrasures in each bunker varies from one to six.

FIGURE 4. Concrete bunker.

A fortified position, in general, is very well camouflaged because the defender has had the advantage of looking at his position from the attacker's viewpoint long before the attacker arrives on the scene. Bunkers are generally set into hillsides to conceal them from observation and to make them more difficult to hit with direct fire. The exposed concrete faces are painted to blend with surrounding earth and shrubbery, or they may be covered with camouflage nets. Bunkers are sometimes constructed in houses, or as haystacks or hummocks. To mislead the attacker, innocent appearing boulders may house firing embrasures, while false embrasures may be painted on visible bunkers. True embrasures may appear as flat concrete walls.

In an attack against a typical fortified position, the attacker first encounters a defensive area consisting of field

fortifications (see figure 5). This area is organized with entrenchments and open weapons emplacements. The open emplacements are occupied continuously except during artillery fire and aerial bombardments, then the troops

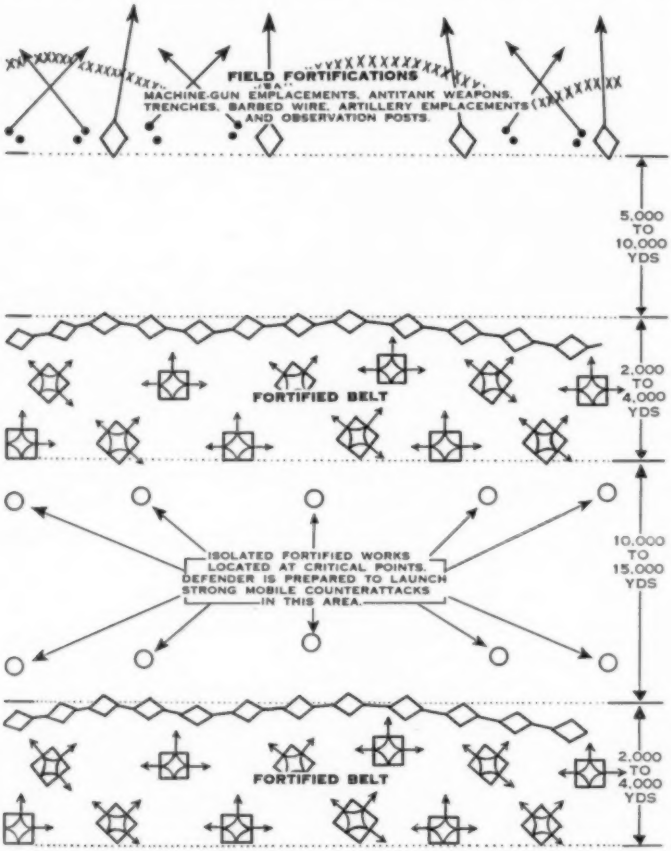

FIELD FORTIFICATIONS
MACHINE-GUN EMPLACEMENTS, ANTITANK WEAPONS, TRENCHES, BARBED WIRE, ARTILLERY EMPLACEMENTS AND OBSERVATION POSTS.
5,000 TO 10,000 YDS
FORTIFIED BELT
2,000 TO 4,000 YDS
ISOLATED FORTIFIED WORKS LOCATED AT CRITICAL POINTS. DEFENDER IS PREPARED TO LAUNCH STRONG MOBILE COUNTERATTACKS IN THIS AREA.
10,000 TO 15,000 YDS
FORTIFIED BELT
2,000 TO 4,000 YDS

FIGURE 5. Organization of a fortified position.

take cover in nearby shelters. Observation posts with good means of communication to the fortified belts in the rear are generally located in this area.

The next line encountered by the attacker is a fortified belt located between 5,000 and 10,000 yards behind the line of field fortifications. These belts contain tank obstacles, wire, combinations of single emplacements and forts, and troop shelters. Generally the bunkers are spaced so that there is at least one for each fifty-five yards of front. The depth of the position makes the average distance between individual works about one hundred and sixty-five yards; however, this distance may be greatly reduced in terrain that favors the attacker. The fortified belt varies from 2,000 to 4,000 yards in depth.

After the attacker has successfully breached the first fortified belt he enters an area of isolated fortified works, located at critical terrain features such as road junctions, bridges, and railroads (see figure 5). This area generally extends for 10,000 to 15,000 yards in depth. While advancing between the two fortified belts, the attacker can expect to be counterattacked by a mobile force.

Next, the attacker may encounter another fortified belt, organized in the same manner as the first belt. These belts are spaced in depth to force the attacker to displace his heavy artillery through the first fortified belt in order to fire against the second belt.

The fortified belts are sited to give the defender the best fields of fire. The ground in front of the fortified area is cleared of unnecessary woods and vegetation. The terrain near the bunkers is landscaped to deny the attacker defiladed approaches.

The fortified belts contain local reserves held in protected shelters or dispersed in concealed entrenchments. In some cases they may move entirely by underground passages to the point from which they are to launch their counterattack or reinforce the position. Even a very slight penetration may cause the defender to launch a local counterattack.

RECONNAISSANCE PRIOR TO THE ATTACK

The search for information of the defender's position is a continuous process. Before the defender's outposts have

been driven in, most of the necessary intelligence is supplied by air reconnaissance and aerial photography. Some information may be obtained through the interrogation of natives living in the general area. As soon as contact is made with the field fortifications, detailed ground reconnaissance is initiated.

The attacker continuously observes the enemy position. Air bombardment and artillery may dislodge some of the camouflage around the installations and disclose their location and some of their characteristics. Changing shadows sometimes disclose details of construction. Often, measurements of visible portions of an installation and close inspection of the surrounding ground reveals the installation to be of standard type, the details of which may be readily obtained from engineer intelligence.

Patrols are used aggressively and seek detailed information within the area being patrolled. This may include information of the obstacles and of the works near the forward edge of the area, location and construction of actual and dummy works, caliber and sector of fire of the weapons, and dead spaces in their fields of fire. The use of elaborate feints may cause the enemy to reveal some of the desired information. All reactions of the defender, particularly those which indicate the location and direction of fire of weapons, are recorded and evaluated by the attacker.

Engineer reconnaissance seeks especially to determine the exact location and character of man-made obstacles such as mines and tank traps, weapons emplacements and approaches to them, and bridges and routes of communication within the area. Vital information such as the exact structural characteristics of emplacements is secured using all available means of intelligence and reconnaissance, and is placed in the best form for the using troops. The engineers prepare an accurate map for the use of the assault troops, showing the location of emplacements, the direction of fire from embrasures, and the type of friendly weapons required for breaching each emplacement. This data, together with the information obtained from air reconnaissance, gives the commander of the attacking force a basis

for selecting the location of his main effort and for formulating his plan of action.

ORGANIZATION

Although the attack of a fortified position is a large scale operation, its success hinges on the action of small units. The necessity for launching a number of simultaneous attacks against individual objectives makes decentralization of control imperative.

Frontages assigned to assault units are less than in other operations—sometimes as narrow as 400 yards per assault battalion. Mobile direct-fire guns are attached to each assault battalion to provide rapid delivery of flat-trajectory, high velocity fires. Engineers are made available in a supporting role. Extra communication facilities and personnel are desirable.

The battalion commander determines the exact point within his zone where he will make his main effort. He determines the sequence of the reduction of the pillboxes and prescribes the formation, plan of maneuver, direct fire missions, and close fire support plan based on this sequence. The over-all fire plan coordinating the employment of general support artillery and air is worked out in advance with the regimental commander.

The assault infantry rifle company is reinforced with the necessary special equipment and supported by direct-fire weapons in accordance with the number and type of fortifications within the assigned zone of action. The assault rifle platoons are issued special arms and equipment to supplement organic equipment. In general, each rifle platoon organizes at least one assault team which is specially equipped and trained in the use of demolition and flame thrower equipment.

Figure 6 shows the organization of an assault team suitable for use against a steel-reinforced concrete weapons emplacement. However, the size of the various indicated parties as well as the variety of weapons and special equipment may be varied to fit the specific mission assigned to the team.

ORGANIZATION OF A TYPICAL ASSAULT TEAM

PERSONNEL	NUMBER	ARMS AND EQUIPMENT
Team leader	1	M1 rifle, supply of hand grenades, pyrotechnic pistol, and radio set.
Demolition party	4	
Demolition men	(2)	M1 rifle and supply of hand grenades. Demolitions may include: pole charge (25 lbs), satchel charge (25 lbs), or shaped charge (size and type dependent on charges available and mission to be accomplished).
Bangalore torpedo men	(2)	M1 rifle, one or two sections of bangalore torpedo, and supply of hand grenades.
Flame thrower party	2	Two flame throwers, pistols, and supply of hand grenades. (Note: if one flame thrower is used, one man acts as an assistant and carries an M1 rifle.)
Automatic rifle team	2	
Automatic rifleman	(1)	Automatic rifle, supply of hand grenades.
Assistant automatic rifleman	(1)	M1 rifle, extra magazines for BAR, supply of hand grenades.
Rocket party	2	
Rocket gunner	(1)	Pistol, rocket launcher 2.36-inch, supply of hand grenades.
Assistant rocket gunner	(1)	M1 rifle, ten rockets, supply of hand grenades.
Rifle grenadiers	1	M1 rifle, M7 grenade launcher, supply of rifle grenades, wire cutters.
Assistant team leader	1	M1 rifle, M7 grenade launcher, supply of hand grenades, wire cutters, panel.
Total	13	

FIGURE 6.

PENETRATING POWER OF WEAPONS

WEAPON	RANGE IN YARDS	PENETRATING POWER	
		ARMOR PLATE	CONCRETE
.30 cal	.....	.....	.....
.50 cal MG	100	1 inch	.....
M9A1 grenade	50	3 inches	.....
2.36-inch rocket launcher	100-300	5 inches	.....
57-mm rifle M18	1,000	3.5 inches (HEAT)	.....
75-mm rifle M20	1,000	4.5 inches (HEAT)	.....
90-mm gun M3	1,000	4.8 inches (APC) 7.8 inches (HVAP)	3.8 feet (APC)
105-mm howitzer M4	1,000	5.5-6 inches (HEAT)	2.1 feet (HEAT)
155-mm gun M1	1,000	7.5 inches (AP)	6.3 feet (APC M78 fuze)
8-inch howitzer M1	1,000	.....	5.5 feet (M78 fuze)
240-mm howitzer M1	12,500	.....	4.9 feet (M78 fuze)

FIGURE 7.

An assault platoon should have at least one direct-fire cannon in direct support or attached. This direct-fire cannon may be a 57-mm rifle from the parent company, a 75-mm rifle from the heavy weapons company, a 90-mm gun mounted on the M26 tank from the regimental tank company, or some other type of direct-fire cannon.

EMPLOYMENT OF WEAPONS

The attacker must have a thorough knowledge of the effectiveness of his organic and supporting weapons against

steel and concrete emplacements (see figure 7). These weapons are generally broken down into two groups—cannon and other weapons. Within the cannon group the attacker normally has at his disposal, organically or attached for the operation, 57-mm and 75-mm rifles, 90-mm guns, 155-mm howitzers, and 155-mm SP guns or self-propelled guns of even larger caliber.

Cannon are assigned direct-fire missions. They neutralize or destroy the permanent works by placing direct fire into the embrasures. Neutralization of the defender's installations outside of the permanent works is accomplished by indirect-fire weapons and small-arms fire of the assault echelon.

The ideal firing position for the direct-fire weapons is defiladed, or at least screened, from all works other than the one on which it is to fire. Firing positions allow fire to be perpendicular, or nearly so, to the walls of the bunkers, thus decreasing the number of ricochets and giving maximum perforation. However, firing positions located in the dead angles of embrasures do furnish a degree of security, and less perpendicular fires are satisfactory if fire can be directed into the vulnerable corners of the embrasure. When emplacing the weapons every precaution is taken to prevent direct-fire weapons from being discovered prior to opening fire. To give continuity of fire these weapons are employed in pairs whenever practicable.

The 57-mm and 75-mm rifles are generally used to neutralize the embrasures of an emplacement rather than to penetrate the concrete or steel emplacement itself. The cumulative effect of these shells is small and such a large amount of ammunition is required to penetrate the heavy steel or concrete of a fortified installation that their use for this purpose is rare.

The 90-mm gun mounted on the M26 tank is a highly effective weapon for firing against a fortified installation. The flat trajectory, high muzzle velocity, and high rate of fire of this gun make it an excellent weapon for neutralizing or destroying individual works. Its extreme accuracy at ranges up to 1,000 yards enables the same spot to be

hit more frequently and makes the cumulative effect of the weapon against reinforced concrete very good. Using AP shell, at ranges up to 1,000 yards it will penetrate a 5-foot concrete wall after 8 to 10 rounds.

The 105-mm howitzer firing the HEAT shell will penetrate 5.5 to 6 inches of armor plate or 1 foot of concrete at a range of 1,000 yards. There is appreciable cumulative effect, especially against thin concrete walls, which disintegrate after a few direct hits. Against heavier walls the effect is less pronounced. Firing the HEAT shell, it requires 20 to 35 rounds to penetrate a 5-foot wall. The HE shell has little effect against heavy concrete or steel.

Against heavy concrete, the 155-mm gun firing HE shell with delay fuse blows a crater about 2 feet deep. The AP or APC (with explosive charge) shells penetrate from 5 to 6 feet of concrete at ranges up to 1,000 yards. One round is sufficient to pierce a bunker with 5-foot walls.

Guns of heavier calibers are proportionately more effective against steel and concrete, but unless they are self-propelled and protected by armor plate, their vulnerability and lack of mobility make them unsuitable for close range work.

Other weapons used to closely support the attacking troops include small arms, antitank grenades, rockets, mortars, flame throwers, explosive charges, and bangalore torpedoes; a proper combination of these weapons will serve to destroy a concrete or steel emplacement.

Small-arms fire directed into an embrasure has a temporary neutralizing effect in that it forces the defender to close the firing apertures. Sliding metal partitions are often jammed by the welts raised at the point of impact, and appreciable damage is done to angle irons protecting embrasure corners and edges, to traversing racks, and to the weapons in the embrasures.

The antitank rocket M6A5 fired from the 2.36-inch rocket launcher penetrates 5 inches of armor plate; the 3.5-inch rocket launcher has a greater penetrating effect. Performance of rockets is not effected materially by angles of impact up to 40 degrees. Being small and portable, the

launchers are suitable for inflicting casualties by close-in fire at embrasures. If the rocket strikes in the immediate vicinity of an embrasure, the resulting cloud of smoke and concrete dust blinds the defender for several seconds.

The high explosive antitank grenade M9A1 penetrates at least 3 inches of armor plate, and it may be employed to neutralize the fire from embrasures. Because of its highly curved trajectory it is generally not effective for this purpose at ranges greater than 50 yards.

Infantry mortars have little destructive effect when fired against the fortifications themselves. However, they are used to fire definite missions in support of the attack against a fortified position. The 60-mm mortars are usually assigned a mission of firing close-in supporting fires against open emplacements when the fires of larger weapons endanger the advance of the assault troops, and they may fire on local enemy counterattack forces. The 81-mm and 4.2-inch mortars smoke enemy observation posts, fire HE to destroy camouflage, neutralize open emplacements, neutralize antipersonnel mine fields and crater ground to provide protection for infantry in subsequent movement, and engage enemy counterattack forces.

The portable flame thrower weighs about 68 pounds loaded and is carried and operated by one man. The tactical range and time burst depends upon the type of fuel used and the wind conditions. The flame thrower is an effective weapon for the neutralization of an embrasure, and is especially useful when the demolition party has moved so close that it is endangered by supporting fires from other weapons. It is also employed in mopping up a bunker after it has been breached. One principal advantage of this weapon is that the flame and smoke spread, filling the embrasures and pouring into ports or other openings.

The hand-placed explosive charge is used to reduce any fortifications which the assault unit can reach. When the charge is placed a short delay fuse or a standard delay fuze is ignited, and the assault unit takes cover while the charge goes off. Repeated heavy charges will breach the strongest parts of any fortification, but ordinarily the charges are

placed in embrasure openings, or packed against doors or other weak points.

The bangalore torpedo M1 is an explosive-filled steel tube designed for breaching barbed wire entanglements. It is also useful for clearing lanes through mine fields. Sections may be connected end to end to form a torpedo up to 200 feet long. A section of bangalore clears a path 10 to 15 feet wide through heavy wire entanglements.

FIGURE 8. Flame thrower in use against a concrete pillbox.

THE ATTACK

The attack of a fortified position includes reducing the hostile outpost system and developing the main position, breaking through the fortifications at the most favorable point, extending the gap by isolating and reducing hostile emplacements on the flanks, and then, completing the encirclement and isolation of the remaining fortifications

while continuing the attack against them from the front. In application, successive stages may overlap, particularly on the weaker portions of the front.

The outpost positions may be of any type from a position consisting of hastily constructed field fortifications to a belt of permanent fortifications closely resembling the main position. Based on the information obtained through reconnaissance, the attacker determines what special troops, equipment, and strength are needed to break through the outpost system. He then organizes his command into tactical groupings and assigns missions to each. As soon as the main position comes within range, heavy artillery and cooperating air bombard the position, paying particular attention to hostile artillery positions. Care is taken that operations against the outpost position do not disclose which part of the main position is to be struck by the main attack of the whole force.

The attack against the main position is preceded by intensive aerial bombardment and artillery and rocket preparations. These preparations are long and heavy and may extend over a period of days. They are fired to drive the defending troops under ground, destroy field fortifications and obstacles, dislodge camouflage, set off antipersonnel mines, destroy artillery positions, and provide craters to shelter attacking troops. Deceptive preparatory fires are delivered against a number of areas along the front of the position.

Bombs of greater weight than 1,000 pounds are effective for the destruction of concrete and steel bunkers, but obtaining direct hits is difficult. Air bombardment is effective, however, even when only a few direct hits are obtained, because of the concussion, the damage to field entrenchments and communications, the dislodgement of camouflage, and the creation of ground craters which the attacker can use for temporary cover during the attack. Napalm bombs are effective for burning camouflage, for producing casualties on personnel in open emplacements, and for casualty and destructive effect if the napalm enters a bunker.

Smoke is employed to good advantage to cover the movement of the assault troops up to their line of departure, and to deny observation on attacking troops from other installations within the immediate area. White phosphorous shells also have casualty effect.

Close supporting fires for an attack against the main position are delivered in three phases. The first phase begins when the preliminary air and ground bombardment has been completed and the assault platoons start moving forward to their objective pillboxes under the cover of all supporting fires. The assault platoons advance under cover of this fire until they reach a point where the supporting fire becomes dangerous to assault platoons, and must be shifted to other targets. Certain direct-fire weapons may move forward with the assault platoons in order to secure more suitable firing positions from which to fire into the embrasures. The accompanying direct-fire weapons move to their previously selected firing positions.

The second phase begins at this point (see figure 9). At this time the supporting fire mission is taken over by weapons organic to the assault platoon or weapons which have advanced forward with the assault platoon, and by other weapons whose fires do not endanger the advance of the assault team. These weapons deliver the fire support which covers the movement forward of the assault team. As the assault team advances and supporting fires of the second phase become too close for the safety of the assault team, the fire lifts to targets in the rear or shifts to targets on the flanks.

The fire support element of the assault team, consisting of rocket launchers, rifle grenade launchers, the automatic rifle and other small-arms provides the supporting fires of the third phase. These weapons take over the fire support role to neutralize the embrasure of the pillbox under attack and thus cover the movement of the flame thrower and demolition parties as they move forward to destroy the bunker. When the supporting fires of each phase lift, they are shifted to targets along the flanks or in the rear of the original target areas. All actions of the assault team point

toward getting the knock-out punch—the demolition party—in against the bunker. Upon breaching the embrasure, elements of the assault team rush the emplacement, using hand grenades and flame throwers to destroy all remaining enemy resistance. When resistance in the bunker has ceased, the base of fire element of the platoon moves up and covers the reorganization.

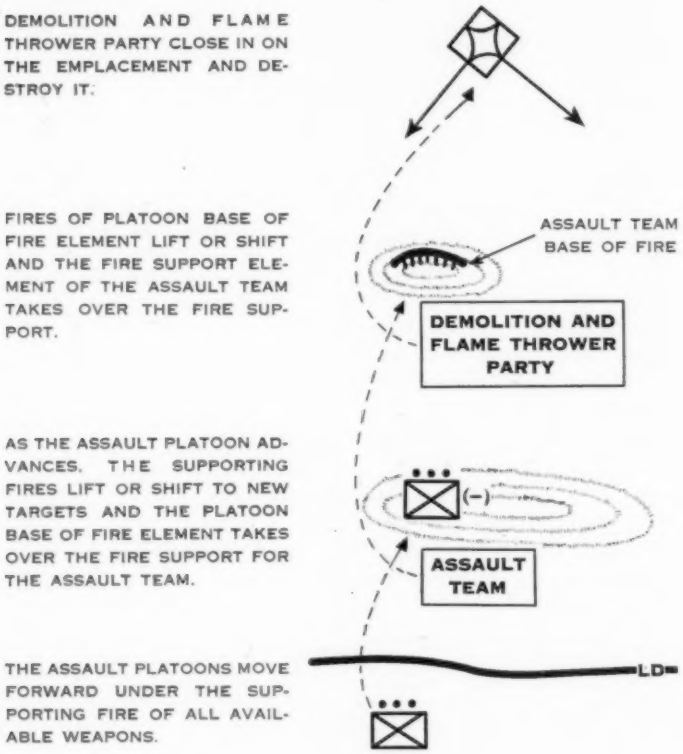

DEMOLITION AND FLAME THROWER PARTY CLOSE IN ON THE EMPLACEMENT AND DESTROY IT.
FIRES OF PLATOON BASE OF FIRE ELEMENT LIFT OR SHIFT AND THE FIRE SUPPORT ELEMENT OF THE ASSAULT TEAM TAKES OVER THE FIRE SUPPORT.
AS THE ASSAULT PLATOON ADVANCES. THE SUPPORTING FIRES LIFT OR SHIFT TO NEW TARGETS AND THE PLATOON BASE OF FIRE ELEMENT TAKES OVER THE FIRE SUPPORT FOR THE ASSAULT TEAM.
THE ASSAULT PLATOONS MOVE FORWARD UNDER THE SUPPORTING FIRE OF ALL AVAILABLE WEAPONS.
ASSAULT TEAM BASE OF FIRE
DEMOLITION AND FLAME THROWER PARTY
(–)
ASSAULT TEAM
LD

FIGURE 9. Phases of fire support for an assault platoon.

The base of fire group of the platoon protects the platoon flanks and is prepared to place immediate fire on local counterattacks. Mopping up is done by reserve elements.

Upon capture of the bunker, the platoon is reorganized and is re-equipped, according to plan, by carrying parties from the battalion pioneer and ammunition platoon or from the battalion reserve.

Close coordination and continuous communication insure the timely lifting or shifting of supporting fires during the various stages of the advance. The signal or command for lifting or shifting fires is given by the commander of the unit whose men are most closely affected by the fire.

Penetration of belts fortified in great depth is usually accomplished by a series of limited objective attacks; other units are leap-frogged through the leading units, which then reorganize, mop up, and prepare to protect the flanks of the penetration. After the leading units make the initial penetration, reserve units move into the area and seal or completely destroy the bunkers.

As the breach in the enemy lines is deepened, additional assault elements from battalion, and later from the regimental reserve, move into the gap to attack the flanking works in each direction and widen the base of the penetration. This process is continued until the gap created is wide and deep enough to permit the passage of exploitation units. Meanwhile, the leading units deepen the penetration by advancing and attacking the next fortifications in their zones. Troops from the rear move rapidly through the gap created.

Operations continue until the zone selected for a major break-through has been penetrated. While the attack progresses, the flanks of the penetration are defended to throw back counterattacks and to protect the passage of troops assigned exploitation and rear attack missions. The penetration must be considered as a defile and antiaircraft protection furnished accordingly.

In densely fortified areas, obtaining a wide gap may involve too great an amount of time and effort. Two penetrations may then be made, a suitable distance apart, and troops pushed through the parallel gaps. These troops then join in the rear to isolate the required portion of the belt and destroy the supporting artillery.

As isolated works are breached by fire or by explosives, mopping up is done by follow-up troops as soon as possible. Mopping up includes reducing or sealing underground installations within the penetrated area. This process is greatly facilitated if troops are used who have been specially trained and equipped. Once a footing has been gained in the underground works, the attacker presses the advantage to

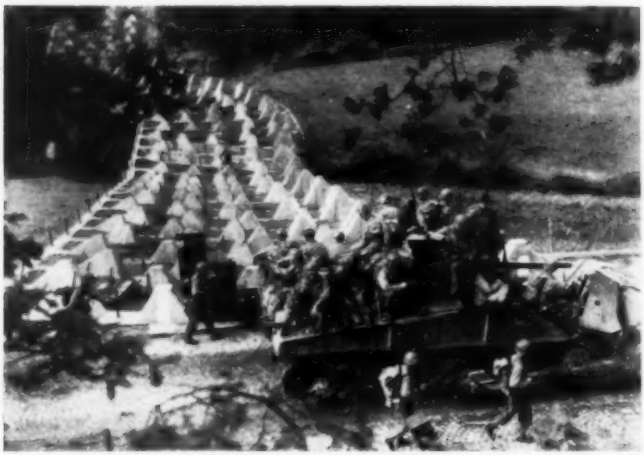


FIGURE 10. Armor is moved through the gap in the fortified line to exploit the pentration.

insure early destruction of all connected turrets and bunkers.

After a penetration has been made the attacker may meet another fortified belt similar to the one he has just breached or he may find himself in comparatively open country suitable for mobile warfare. If the former is the case, then the task again becomes one of a limited objective attack by infantry. The latter case favors the use of armored units, motorized infantry, or other highly mobile units. As soon as the width of the gap and the degree of security permit, these units are moved through the gap and released in the

open country to the rear to exploit the penetration which has been made.

CONCLUSION

Any fortified position can be reduced if the attacker is aggressive and properly employs his available weapons. The Normandy beach defenses and the Seigfried Line were designed to hold an attacking force for at least 90 days; however, Allied troops, by proper application of fire power and coordination of supporting arms, were able to assault and breach these defenses in much less time.

Today there is much being said about new developments in weapons of war and what their effect may be upon a war of the future. Regardless of what these developments may disclose in the way of new weapons of war, we know that in our Army today we have the weapons which when properly employed enable us to breach a strongly fortified position.

Antiairborne Defense

"—where is the prince who can afford so to cover his country with troops for its defense as that ten thousand men descending from the clouds, might not, in many places, do an infinite deal of mischief before a force could be brought together to repel them."

Benjamin Franklin
1784

Today the problem visualized by Benjamin Franklin over a hundred years before the flight of a heavier-than-air craft is a reality. The means now exist for transporting ten thousand men by air. Consequently, within the past few years antiairborne defense has become a subject of vital importance to national security.

The frightening term "vertical envelopment" was first heard during the last war. Newspapers, in big headlines, peopled the skies with parachutists and gliders. The Germans successfully conducted airborne actions in Holland, Belgium, Norway, and the Balkans, and they were able to seize the entire island of Crete from the Allies through vertical envelopment.

The Allies, once air superiority was achieved, demonstrated their skill at vertical envelopment on an even larger scale in Sicily, Italy, New Guinea, Normandy, Southern France, Holland, and the Rhine crossing. As a result American forces now have the experience, skill, and know-how of airborne assault, but our experience and knowledge of antiairborne defense is extremely limited and must be developed during peacetime training.

Predictions are now frequently heard that forces of the future must be largely airborne or air transported and that entry into combat by air will become commonplace. In light of these predictions one question is looming ever larger in

the military mind. *How can we defend against an airborne attack?*

CAPABILITIES

In considering antiairborne defense it must be accepted that all areas cannot be denied to enemy airborne landings. The commanders of large land areas must determine the most likely airborne objectives and employ their troops to defend these objectives and the critical areas surrounding them. The defense of these critical areas is assigned to divisions or smaller units. Emphasis must be placed upon rear areas, as the concept of airborne employment makes these areas most vulnerable to airborne attack.

The mission of antiairborne defense is to determine enemy landings by using all available intelligence agencies and warning systems; to destroy enemy aircraft by antiaircraft fire; to disorganize, delay, and contain the landing forces through local defense forces; and to destroy the landed forces by counterattack with a mobile striking force.

When large areas of responsibility are assigned, excessive dispersion of troops is avoided because dispersion tends to destroy the flexibility of the defense. The principal troop dispositions consist of a *warning system, local defense forces,* and a strong, centrally located *mobile striking force.* Antiairborne defense is characterized by defensive-offensive action.

Because of the inherent strategic mobility of airborne forces, all commanders prepare for antiairborne defense. The initial assignment of critical areas requiring antiairborne defense is accomplished by the superior commander. Reserves of front line regiments and divisions, are, in addition to their other missions, charged with the antiairborne defense of their respective regimental and division rear areas. When particularly vital installations or areas are deemed likely airborne objectives, an entire division may be employed on an antiairborne defense mission; however, so large an organization is not often employed for antiairborne defense of a given area.

Frequently the assigned area of responsibility for antiairborne defense includes installations of higher headquarters or other services, such as depots or airfields. The overall plan of antiairborne defense of the assigned area of responsibility, and all installations therein, is the responsibility of the antiairborne defense commander. Close coordination between the commander of the antiairborne defense unit and the commander of the installation is required to insure in the overall plan the most advantageous employment of personnel and weapons available to the commander of the installation. The immediate protection of the installation has priority in the employment of such personnel. Frequently, antiaircraft elements and local defense force elements are located in the same area. Coordination is made by their commanders to insure mutual support and close-in protection.

CIVILIAN ATTITUDE

Upon assuming the responsibility of an area for antiairborne defense the commander takes cognizance of the civilian attitude before organizing the defense.

A friendly civilian population may be of considerable assistance to the commander defending an area against airborne attack. In order to achieve maximum assistance from this source the commander has the responsibility of planning and organizing the civilian participation in the defense. Civilian participation may include intelligence and warning measures, construction of antiairborne obstacles or defense areas, and certain types of resistance measures. To obtain intelligent participation civilians are oriented and trained in each of the phases of participation. Detailed instructions are issued covering the actions and conduct of civilians before and during an airborne attack. Close liaison is maintained between the commander and the leaders of the civilian groups, and rehearsals are conducted to insure a proper understanding of the conduct of the defense.

A hostile civilian population is expected to assist an enemy airborne force in every possible way, to include furnishing detailed intelligence reports, operating homing devices for hostile aircraft, sabotage, and active resistance. The commander of the antiairborne defense must take positive measures to preclude the organization of hostile civilian groups and to seek out those who are capable or likely of abetting the airborne attack. Such measures include counterintelligence, curfews, evacuation, searches for any type of equipment that could be employed to assist an airborne attack, protection against sabotage, control over transportation and communication facilities, and regulation of civilian movement in or out of the defense area.

TRAINING

The training in antiairborne defense should emphasize: first, the importance of adequate and reliable communication for the local warning system; second, the careful organization of the local defense force and passive measures to delay, disorganize, and contain the enemy; third, the retention on battalion and higher level of a mobile striking force of sufficient size to cope with massed airborne landings.

Before a unit conducts training in the organization and conduct of antiairborne defense it is familiarized with this type of attack. This prior training should cover the technique of employment of airborne forces, using, when possible, actual airborne landings, and emphasizing the vulnerability of this type of attack. An understanding of airborne employment helps dispel the defender's fear of airborne attack.

Intelligence agencies furnish current information of the aggressor airborne troops. This information includes uniforms, equipment, organization of aggressor airborne troops, and a description of aggressor air-transports and gliders. Training stresses the importance of this information, so that early and positive identification of enemy airborne troops is made.

In order to achieve the high degree of flexibility and coordination required, rehearsals of antiairborne defense are conducted. These rehearsals cover the various combinations of possible enemy landings, and if practicable, they include all phases of the defense and participation by all elements to include civilian groups. Rehearsals are progressive from the lowest command to the highest command in the area, and are as extensive as the situation permits. Only by frequent rehearsals will the defense attain the necessary speed in execution of its plans. The actions required of various elements of the defense can best be stressed by rehearsals which are carried out during both daylight and darkness.

DEFENSIVE AREAS

Factors which influence the size of the area assigned to a unit for antiairborne defense include: the number and size of possible enemy landing areas, the number and importance of key installations and critical areas which are likely airborne objectives, the road net and trafficability of the area, the mobility and fire power of the unit, and the attitude of the civilian populace. As a guide the following figures are considered usual in assigning areas or responsibility to units for antiairborne defense:

Unit	*Area*
Infantry division	27-45 miles on a side
Infantry regiment	9-15 miles on a side
Infantry battalion	3-5 miles on a side

Areas of responsibility assigned to the units are carefully selected so that both the likely airborne objectives and the probable landing areas that support them are included within the area of responsibility of one unit. Consideration is also given to the relative importance of the airborne objectives, the lines of communication within the area, and concealment available for elements of the defense force. (See figure 1.)

Upon being assigned an antiairborne defense mission, the commander makes a map and terrain reconnaissance to determine likely airborne objectives and landing areas,

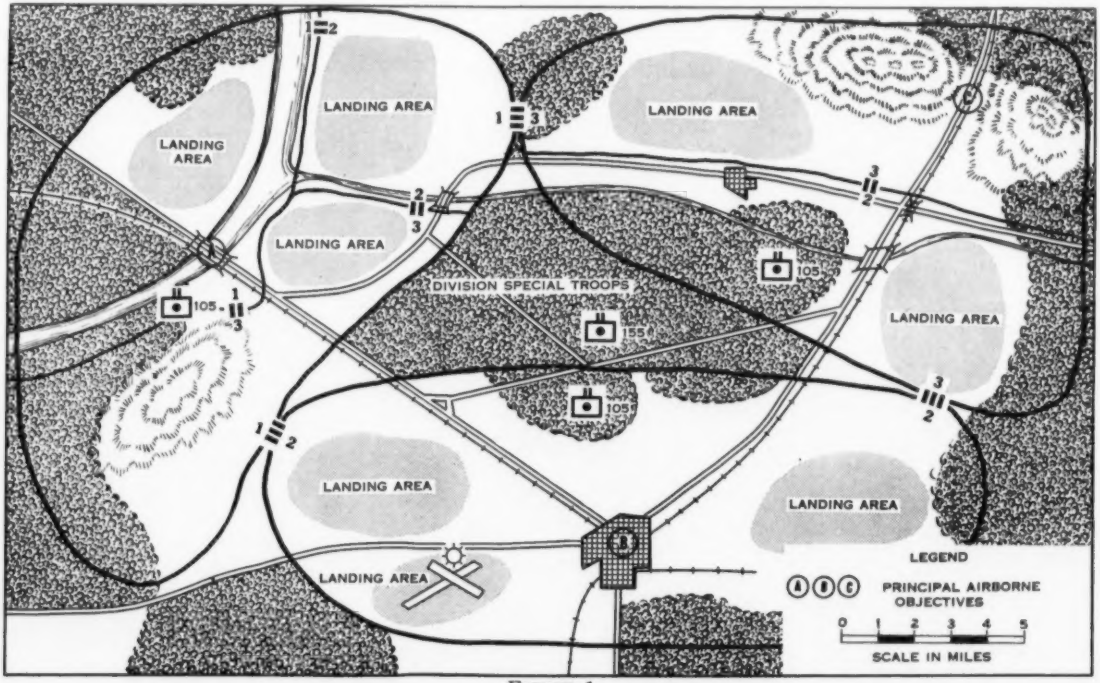

LANDING AREA
LANDING AREA
LANDING AREA
LANDING AREA
LANDING AREA
LANDING AREA
LANDING AREA
DIVISION SPECIAL TROOPS
105
105
155
105
LEGEND
PRINCIPAL AIRBORNE OBJECTIVES
0 1 2 3 4 5
SCALE IN MILES

FIGURE 1.

terrain features critical to the defense, passive defense measures, tentative troop dispositions, and boundaries for subordinate units.

SUPPORTING WEAPONS

The extent of the areas frequently assigned to units may require decentralization of certain supporting weapons. Field artillery battalions that are centrally located with respect to the division area seldom have sufficient range to cover the majority of the probable landing areas. Therefore artillery, heavy mortars, or 81-mm mortars may be decentralized so that the fire plan covers all likely landing areas and furnishes fire support for all prepared positions. (See figure 1.) Antiaircraft artillery is normally disposed throughout the entire area of responsibility to provide antiaircraft fire over probable landing areas, likely airborne objectives, and critical terrain features. When battalions or regiments are widely separated antiaircraft elements may be attached to them.

Since the fires employed in antiairborne defense fall within the friendly defensive position, the fire plan requires detailed coordination and control. The phases of fire include *fires against low flying hostile aircraft; fires on landing areas; fires in support of local defense forces; and fires in support of the mobile striking force.* The details of the fire plan are disseminated to the leaders of all elements of the defending force to facilitate timely fire and adjustment of fire on renumerative targets. Flexibility of fires is planned and supporting weapons not otherwise engaged are prepared to move to supplementary positions to support a threatened area. Smoke may be used effectively to conceal the movement of the mobile striking force.

Organic and attached antiaircraft artillery is disposed throughout the area of responsibility to cover the landing areas, the approaches thereto, likely airborne objectives, and critical terrain features. When practicable, centralized control is maintained to prevent premature firing, and to capitalize on the antiaircraft artillery's organic warning system. In addition to aitiaircraft artillery, other suitable

weapons are prepared to fire on transports and gliders approaching a landing area.

Detailed plans are prepared to cover landing areas with the maximum volume of fire, in order to inflict as many casualties as possible before the enemy can organize. Concentrations and sectors of fire are prearranged to permit fire under all conditions of visibility.

Fires in support of local defense forces are prearranged in the same manner as fires in support of a defensive position; and fires in support of the mobile striking force are prearranged as for those used in support of a counterattack.

ORGANIZATION OF DEFENSE

Troops are disposed to provide for *a warning system, a local defense force,* and a *mobile striking force.* The organization of these echelons varies according to the plan of defense and is based upon the terrain and troops available. Normally, a division area is divided into three regimental areas of responsibility, with elements of one or more regiments furnishing, or prepared to furnish, the division mobile striking force. A regimental area may be divided into two or three battalion areas of responsibility, depending upon such factors as the terrain, the number of landing areas, and the likely objectives. Areas of responsibility are seldom assigned to units smaller than the battalion. To provide an effective striking force within an area of responsibility, decentralization below battalion is held to a minimum consistant with the requirements of the warning system and the local defense force.

The areas of responsibility of subordinate units are delineated by boundaries located to facilitate the defense. If the area of responsibility is large or if the likely airborne objectives and landing areas are widely separated, boundaries for subordinate units may not be adjacent. Subordinate units prepare plans for the organization of critical terrain features or likely airborne objectives within their areas and establish their sub-boundaries accordingly.

The principal advantage enjoyed by airborne forces is surprise. In order to minimize this advantage a detailed

warning system is established to provide both local and distant warning.

WARNING SYSTEM

Warning stations are made up of from three to six men in order to form reliefs for manning the observation post. The observation post itself occupies a position which is high above ground level in order to provide maximum observation over the landing area and to observe the landed enemy as long as possible. Warning stations may be supplemented by motorized patrols.

The local warning system includes all forms of intelligence and disseminates information to all elements of the command. A series of warning stations is established throughout the area of responsibility to observe all possible landing areas. The purpose of the local warning system is to provide timely information of enemy airborne landings, including the location, size, and movements of landed forces. This information is the basis upon which decisions are made to employ the mobile striking force in the conduct of the defense.

Each unit assigned an area of responsibility maintains a series of warning stations within its area. To insure detailed coverage and where practicable, overlapping sectors of surveillance, the next higher headquarters coordinates the location of the warning stations established by the subordinate units. To supplement the overall local warning system and to provide additional channels of warning, the higher headquarters superimposes its own warning stations throughout the entire area on the warning system of the subordinate units. Reports from the warning stations are submitted direct to the establishing headquarters, and subordinate units immediately transmit the information to the next higher headquarters. All available means of communication are employed including wire, radio, and visual signals. Organic equipment is supplemented by local communication facilities. One or more alternate wire lines are laid to each warning station and lines are buried to prevent destruction by the airborne force.

The distant warning system includes all forms of information and warning of an impending airborne attack. To determine the enemy's intentions, higher headquarters collects information from all available intelligence agencies. Such agencies include the Air Force, antiaircraft warning services, and special intelligence agencies available to army or higher headquarters. To obtain timely information the antiairborne defense commander requests air coverage over likely airborne marshalling areas and arranges for expeditious transmittal of information from agencies along probable air approach routes. In addition to transmittal of information to subordinate units by wire and radio, an alert warning system of both visual and audible signals is organized.

LOCAL DEFENSE FORCE

The local defense force consists of small detachments established in the vicinity of landing areas, likely airborne objectives, and critical terrain features. The mission of the local defense force is to delay, disorganize, and contain the airborne force until the mobile striking force can launch a counterattack to destroy the enemy.

The local defense force seldom exceeds one-third the strength of the unit assigned an area of responsibility. Within a battalion area a rifle company reinforced, or an equivalent force, is employed as the local defense force. Depending upon the number of positions to be organized, the distance between the positions, and the availability of supporting fires and the mobile striking force, the local defense force may be reinforced with such supporting weapons as 60-mm mortars, 81-mm mortars, machine guns, recoilless rifles, and tanks.

The local defense force is normally disposed in a series of independent detachments varying in size from a rifle squad to a rifle platoon reinforced. When two or more positions are relatively close together the local defense commander may retain a local reserve for immediate employment to counterattack or to reinforce a threatened area. In addition to bringing immediate fire on the airborne force with organic and attached weapons, each detachment is prepared

to call for and adjust available supporting artillery and mortar fires.

All positions occupied by the local defense force are prepared in the same detail as in the organization of a battle position. All factors normal to selection of a defensive position are considered, as well as how the mobile striking force is likely to be employed and how the local defense force can best support the counterattack. Prepared positions are concealed from enemy air observation and aerial photography. In addition to the primary and supplementary positions for each detachment of the local defense force, positions are organized so that any detachment can be reinforced. The number of positions prepared varies with the relative importance of the terrain features, the defensive strength of the area, and the time-space factors. Positions may be prepared adjacent to a detachment overlooking a landing area so that reinforcements of one or two platoons could be placed in this defense. For important likely airborne objectives, positions may be organized to include an entire battalion defense area.

MOBILE STRIKING FORCE

Defense against airborne attack requires the highest degree of flexibility. To gain flexibility and to strike the airborne force as soon as possible, each unit assigned an area of responsibility organizes a mobile striking force. The mission of the mobile striking force is to destroy the landed airborne force by counterattack. The proper and timely employment of the mobile striking force is the decisive element in the antiairborne defense. Initial reports of an airborne landing must be verified and evaluated. When necessary, officer reconnaissance patrols are employed to verify the presence and location of reported airborne landings.

A mobile striking force should be motorized, strong in fire power, and of sufficient size to cope with an airborne force employed in mass on a given landing area. Tanks are an excellent weapon for use in the mobile striking force because of their armor protection, fire power, mobility, and

excellent means of communication. In a battalion the mobile striking force should be approximately two-thirds of the troop strength of the battalion. In regiments and divisions the proportional size of the mobile striking force will be less, depending upon the plans for employing subordinate mobile striking forces. The regimental mobile striking force may consist of selected elements of the regiment retained under immediate control of the regimental commander; it may consist of one or more of the battalion mobile striking forces; or it may consist of a combination thereof. When the regiment retains a separate mobile striking force, the force varies from a company reinforced to a battalion reinforced. The division mobile striking force may be organized as outlined for the regiment. A separate division mobile striking force normally does not exceed a battalion reinforced. A greater portion of armor is allocated to the division mobile striking force. Flexible plans are made for the employment of more than one mobile striking force in a given area. This limits the ability of the invader to isolate the entire mobile reserve, and normally expedites the launching of counterattacks.

The mobile striking force is normally located in an assembly area where it has concealment from air observation and photography and where it is readily available to the several areas of probable employment. The assembly area should be accessible to good routes of communication and should permit dispersion, cover, and protection against air attacks.

Plans for the employment of the mobile striking force include counterattack plans to destroy the landed airborne force both within the area of responsibility of the controlling headquarters and within the area of responsibility of adjacent units. In addition to counterattack plans, a battalion mobile striking force may plan to occupy prepared positions to defend an important airborne objective or critical terrain feature within the battalion area of responsibility. These prepared positions are occupied in case of emergency or as part of the plan of defense of the next higher headquarters.

All types of passive defense as employed in the organization of a battle position are employed in antiairborne defense, plus additional measures to impede the landing parachutists, gliders, and airplanes. Plans for passive defense measures are coordinated by the senior commander.

All forms of passive measures are employed to deceive the enemy as to the location of prepared positions and installations; to divert his landings into other areas by creating the impression of force; and to delay, disorganize, and contain his landing airborne force. The construction of dummy positions and the obstruction of landing areas constitute the primary passive measures. Engineers are used to assist in this construction. Passive measures of defense can effectively supplement the reduced strength of a defender.

The method employed for obstruction of landing areas depends on ingenuity and the materials available. One method is to place poles, ten to twelve inches in diameter and ten feet high, throughout a possible landing area. These poles are spaced about a hundred feet apart and are connected by barbed wire. Other methods include mine fields, flooding, and any form of obstruction to wreck gliders or to make parachute landing hazardous. The location of obstacles is planned in detail; they are concealed or purposely exposed—depending upon the plan of deception. The landing areas nearest to likely airborne objectives receive priority. The construction of obstacles delays and disorganizes an enemy landing and provides time for the mobile striking force to counterattack before the enemy can seize his objective. Some landing areas may be adequately denied by obstructing their center portions only.

Dummy positions deceive the enemy as to the true location, strength, and composition of the antiairborne force. The extent and method of this construction varies with the type of deception desired. Extensive dummy positions in a given area may be employed to divert the airborne assault into another area more favorable to the defender, or to completely discourage the use of airborne troops in a given area. Aerial photographs of the area are taken to

determine the effectiveness of the deception. False information, camouflage, and movement of troops may be used to deceive.

An airborne enemy may be expected in some cases to land on the objective at night. A critical objective is defended at night from positions on the objective. In a night landing the enemy is at a disadvantage because he is in strange territory, and is further hampered in his assembly and concerted action by reduced visibility. Plans for night counterattacks include the employment of all forms of night illumination on likely landing areas and assembly areas. To prevent mistaken identity and confusion the night attacks are coordinated and rehearsed.

CONDUCT OF DEFENSE

Antiairborne defense is characterized by counterattack, speed, and flexibility. Once the attacker comes within range, maximum fires are directed on him to inflict casualties, delay his organization, and contain his movement. Counterattacks launched without delay destroy the landed airborne force.

The airborne attack follows a pattern which influences the conduct of the defense. This pattern of attack normally includes the following phases; air reconnaissance, air bombardment, initial landing, and build-up. The first two phases do not create a certainity that an airborne attack will follow, but to the commander responsible for the antiairborne defense of an area, the increase of air reconnaissance and air bombardment are indications that an airborne attack may follow.

From the distant warning system the commander should learn when his area is subject to enemy air reconnaissance. During these periods the elements of his command which he desires to keep concealed are kept under cover. The camouflage of positions, weapons, and installations which are to be concealed is maintained or improved. Areas being obstructed by exposed obstacles may be obviously undergoing construction during enemy air reconnaissance. Maximum use of deceptive measures is made during periods of

known enemy air reconnaissance. To add realism, dummy positions may be manned by real troops. Defensive troops may be moved and countermoved to deceive the enemy as to the actual strength of the defending forces in the area. A good plan of deception properly executed may cause the airborne attacker to land his forces in a location which favors the defender.

Suitable antiaircraft weapons fire on enemy bomber formations. The organic antiaircraft weapons of the infantry division engage targets within the limitations of their effective range unless specifically directed to withhold their fire until the initial landing phase. The air bombardment phase may be carried out over a period of several days, or it may be short and followed immediately by the initial landing. Immediately after the bombardment, measures are taken to reestablish the integrity of the antiairborne defense. These measures include restoring disrupted communications, replacing damaged equipment, repairing damaged positions, and reorganizing units suffering casualties.

During the initial landing the defense is active and aggressive. Upon the approach of enemy aircraft all elements of the antiairborne defense are alerted. All weapons within range and capable of firing on aircraft, direct their fire on transports and gliders approaching the landing area. When the airborne force begins the descent to the landing area, maximum available fires are placed on the threatened areas. Prearranged artillery and mortar concentrations are called for by observers or personnel of the local defense force. (See figure 2.) Direct fire weapons engage targets of opportunity, or if necessary, cover their prearranged sectors of fires on the landing area. Supporting weapons keep the landed enemy under an intense volume of fire. Continuous reports are submitted by warning stations and local defense forces as to the strength, location, and movement of the enemy force. The local defense force contains the enemy by reinforcing a threatened detachment or by counterattacking. If reports from local warning stations and local defense forces are confusing or fail to indicate the major landing, officer reconnaissance patrols are used

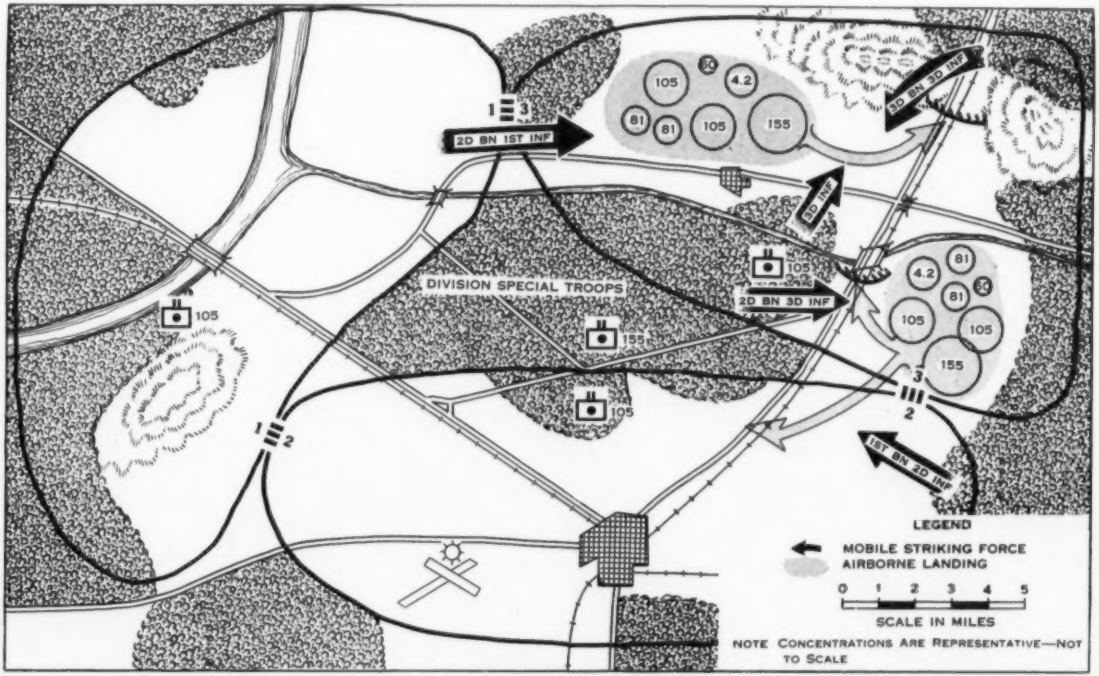

105
4.2
81
81
105
155
2D BN 3D INF
2D BN 1ST INF
3D INF
105
2D BN 3D INF
DIVISION SPECIAL TROOPS
105
155
105
4.2
81
81
105
105
155
1ST BN 2D INF
LEGEND
MOBILE STRIKING FORCE
AIRBORNE LANDING
0 1 2 3 4 5
SCALE IN MILES
NOTE CONCENTRATIONS ARE REPRESENTATIVE—NOT TO SCALE

FIGURE 2.

to gain the information necessary for the proper employment of the mobile striking force.

As soon as the intentions of the enemy are revealed through the location of the landing and direction of movement, the mobile striking force strikes. (See figure 2.) Supporting weapons out of range are moved to supplementary positions to cover the threatened area. Maximum available fire power neutralizes the enemy preparatory to and during the counterattack. If the initial counterattack is not successful, the mobile striking force contains the enemy until such time as other counterattacking forces can be employed against him. If the hostile landing is of such size and location as to preclude successful counterattack, the mobile striking force may be moved directly to prepared positions for defense of the critical objective.

Following the initial landing the hostile force can be expected to bring in reinforcements by air. The antiairborne defense commander makes plans to prevent the reinforcements from joining the initial landing force. Critical terrain dominating the landing areas is held or recaptured to neutralize and contain enemy reinforcements. Mobile striking forces not employed in the defense of critical terrain or likely airborne objectives are reorganized and committed to best facilitate the defense. Efforts are made to destroy small units of the airborne force before reinforcements can arrive or before several small units can join.

SUMMARY

For successful conduct of antiairborne defense, troops must be trained to overcome the fear of an airborne attack. The initial advantages the airborne force enjoys in surprise, mass, and the offensive, requires an extremely well coordinated and highly flexible defense to counter it. Some degree of success in the initial landings must be conceded to the attacker. The defender who has carefully organized the defense and who executes vigorous, large-scale counterattack can neutralize and destroy the hostile landing force before it accomplishes its mission.

Extension Course of The Infantry School

The Army Extension Course of the Infantry School is part of an integrated plan of military education. It affords the only means available for the majority of officers and men in the civilian components to keep abreast of the latest training methods, doctrine, and tables of organization and equipment of the Infantry. In so doing, the Army Extension Courses fill a particular need at this time when many officers and men find themselves assigned to new jobs for which they received no qualifying instruction during their wartime service. By constant revision of subcourses the extension course frequently is able to present new material far in advance of normal training literature.

Besides the personal benefit that the Army Extension Courses may be to the officers and men participating, it is of decided importance to the defense of our country. There are approximately 70,000 Infantry officers in the civilian components of whom only a few can take resident instruction at service schools or civilian schools offering military instruction. Through the medium of the Army Extension Courses, the school is brought to the student. If an emergency arises and the armed forces are required to effect a rapid expansion, those officers of the civilian components who have kept abreast of the rapidly changing military situation by studying extension courses will be better prepared to perform their military duties. The civilian soldier of today must be the literal counterpart of the "minute man" of the Revolutionary War; the tempo of modern war does not permit the luxury of a long transition training period.

The mission of the extension course of The Infantry School is to provide a progressive non-resident course of military instruction which parallels resident instruction.

The accomplishment of this mission will be greatly accelerated by the recent granting of army extension course credit for resident instruction received at a service school since 7 December 1941.

ADMINISTRATION

Prior to World War II the administration of the extension courses was decentralized. The Adjutant General furnished the lesson material and the necessary texts to unit instructors. Each unit instructor solicited and approved enrollments, distributed lesson material, received and graded solutions, maintained records, and issued certificates of completion within his own unit.

At the end of the war, and as a result of an early conference which was held to determine how the Army Extension Courses were to be administered, it was decided that central control was more desirable.

The advantages of central control are many. It relieves the unit instructors of a great deal of paper work and permits them to devote their time to personal contact with their group or unit. It promotes uniformity of grading under a specially trained and supervised group of officers. It facilitates the supply and distribution of lesson material to the students. Above all, it places the administrative agency beside the preparing agency—the school which teaches the doctrine—thus permitting frequent revision to insure that army extension courses lesson material parallels resident instruction.

The prospectus of the extension course of The Infantry School (Appendix 1) follows. Note the many subjects or subcourses that are taught. Each subcourse consists of three to nine lessons and an examination or review. Although Appendix I is the prospectus of The Infantry School, all subjects listed are not prepared by the Academic Department of The Infantry School. An abbreviation "com," for common, appears after certain subcourses listed. This indicates that the instruction is common to two or more schools but for uniformity of doctrine and economy of effort, only one school is responsible for its preparation.

For example, Map and Aerial Photograph Reading is a subject beneficial to officers of all grades and all arms or services. Because the Corps of Engineers is responsible for the production of maps, they have been given the responsibility for preparation of the subcourses listed in the prospectus of The Infantry School as 20-1 and 40-1. The same economy of effort is effected throughout the army extension course program.

Any subject can be taught by extension course methods except one which is highly technical or one which requires special equipment. For example, rifle marksmanship obviously can not be taught by mail.

You will note in the prospectus that the course is divided into series. Each series includes a number of subcourses arranged so that the scope and level of instruction is commensurate with the grade and military experience of the student—the 20 series for 2d lieutenants, 30 series for 1st lieutenants, 40 series for captains, 50 series for majors, and the 60 series for lieutenant colonels. The prospectus lists all subjects that are to be administered by the Army Extension Course Section of The Infantry School. However, only those subcourses marked by an asterisk are currently available for distribution. To date, the preparing agencies have been able to keep only a short distance ahead of the students since it takes six to nine months to prepare a subcourse but requires only three to four months for the average student to study it. Regardless of the level of instruction of the series, there is full opportunity for an officer to enroll in a subcourse in the lower series in order to "brush up" on a particular subject. A major, for example, might desire to study a subject such as Map Reading in the 40 series before starting on the 50 series. Likewise, an officer may apply for enrollment in a subcourse of a higher series than his grade would ordinarily permit if he is able to state a good reason for his request.

The credits or credit hours allocated to each subcourse indicate the time the average student will require to study the assigned texts, read the situations given, and solve the requirements. These credit hours are suballocated to each

separate lesson. A lesson or an examination is designed so that a student may complete it at one sitting—that is, in two or three hours.

Explicit information on the method of enrollment in army extension courses can be found in paragraph 11, Army Regulations 350-3000, dated 30 March 1946. In general, it provides that application for enrollment will be made on WD AGO Form 145. Applications of all personnel of the Regular Army, National Guard, and Organized Reserve Corps in regularly organized units, will be made through channels to the regimental (separate battalion, separate company or detachment) commander, or to the individual's immediate commander in the case of units above the regiment. Approved applications will be forwarded to the service school. Those applicants of the Organized Reserve Corps who are not assigned to regularly organized units will forward applications direct to their regular army instructor.

GRADING

When an enrollee mails his completed solution of a lesson to the Army Extension Course Section of The Infantry School, it is immediately delivered to the grading committee. Usually a comment sheet lists many of the errors of commission or omission that the student might make, and the grading officer checks those applicable and returns a copy of the comment sheet, together with a solution and the graded lesson, to the student. The grade given the student is determined by the evaluation of each comment as listed on the cut sheet. The student receives a mark of superior for a rating of 95 to 100 per cent, excellent for 88 to 95 per cent, satisfactory for 75 to 88 per cent, and unsatisfactory for a rating below 75 per cent. The numerical grade is kept on file as a basis for computing the final rating for the subcourse.

If, on any lesson, a student receives an unsatisfactory rating, his first solution is marked by the grading officer with helpful comments in order to aid the student on his second solution. The maximum rating given for a second solution is 75 per cent.

A review lesson or an examination is graded in the same manner as an ordinary lesson except that on a second solution the student is not limited to a maximum grade of 75 per cent as in the case of an ordinary lesson.

If a student should fail a subcourse, he may repeat the subcourse after it has received a major revision. In the meantime, he may continue with some other subcourse.

A very close contact with the student is gained by the grading procedure. Letters from students reveal their opinion of the lesson material and frequently serve as a guide in preparation of other lessons. Even when the student is asking for clarification of lesson material he is aiding in a proper analysis of that lesson.

Besides the many notes and comments that are received from the students, there are other means of judging lesson materials. The grading officers maintain a complete tally of every requirement that a student answers incorrectly and every comment received from a student. In addition, a record is made of every lesson graded and the number of lessons failed. In this way the validity of each requirement, measured in terms of student reaction, is judged. When a high percentage of students fail a requirement or a lesson, an analysis of the requirement is made by the grading committee, and sent to the preparation committee with specific recommendations for correction. Thus errors in printing, errors in fact, and lack of clarity are quickly corrected by the issuance of errata sheets pending reprinting or revision of the subcourse.

CONSTRUCTIVE CREDIT

The recent issuance of instructions from Headquarters, Army Field Forces, modifies AR 350-3000 for the purpose of granting extension course credit for successful completion of parallel resident courses of instruction at service schools since 7 December 1941. As a large per cent of all National Guard and Reserve Officers attended one or more of the many courses offered at The Infantry School during the war, many students will benefit by this policy. In order to receive this credit it is important that each applicant list

all pertinent data on the amount of resident instruction completed at any service school to include the names, numbers, and dates of the courses attended.

Since it is intended that the extension courses be administered to meet the needs of the students it is not expected that any students should be required to repeat instruction that they have thoroughly covered in resident instruction at service schools. Therefore, in order to aid the authority who approves or disapproves the student's application for enrollment and who may also permit the student to omit designated subcourses, The Infantry School has prepared a list of courses of resident instruction held since 7 December 1941 with a corresponding list of exemptions from subcourses. In addition, a card index file has been prepared which includes the names of all students who have attended certain courses at The Infantry School since 7 December 1941 and indicates the course taken and grade received. With such a file it will be an easy matter to assist a commander or unit instructor in processing an application wherein insufficient information is listed on the application form.

The Infantry School determines which courses of instruction of the resident classes and which army extension courses are equivalent. Thereupon, the Director of the Extension Course Section notifies the applicant's or student's immediate commander or unit instructor what exemptions are recommended for the student. The immediate commander or unit instructor (who knows the ability of the student) grants the exemptions which he believes proper and notifies the extension course director. Although a student may be granted constructive credit for a particular subcourse, he may apply for it if he so desires.

The Infantry School will keep unit instructors informed of the proper subcourse exemptions authorized for the many different courses conducted at The Infantry School. This list of exemptions will be modified annually in order that credit will not be recommended for courses that taught methods or techniques which are now obsolete. Records of the exemptions granted by commanders or unit instructors

will be maintained on student progress cards. Likewise, the recorder will assist in determining the correct data on the course or class number the student attended if the student is unable to recall the required information.

CONCLUSION

The Army Extension Course program offers many advantages to the officer of one of the civilian components, including the following:

It permits him to continually improve his military efficiency and prepare himself for promotion without interference with his necessary activity.

It enables him to keep abreast of changes in doctrine and equipment.

It permits him to refresh himself on military matters under the guidance of highly expert instructors.

It provides him the opportunity, through correspondence, to clarify any details which may be obscure.

Above all, it enables him, through study and application at his own convenience, to hold and improve his knowledge of military affairs.

APPENDIX I

PROSPECTUS OF THE EXTENSION COURSE OF THE INFANTRY SCHOOL

Subcourse	Title
	20 SERIES
20-1*	Map and Aerial Photograph Reading—II (com), nine lessons and an examination.
20-2*	Methods of instruction (com), six lessons and an examination.
20-3*	Military Law—Courts Martial (com), seven lessons and an examination.
20-4*	Crew Served Infantry Weapons not Self-Propelled (com), nine lessons and an examination.
20-5	The Infantry Tank in the Infantry Regiment, eight lessons and an examination.
20-6	Hasty Field Fortifications and Obstacles (com), five lessons and an examination.
20-7	Mess Management (com), 7 lessons and an examination.
20-8	Intelligence and Reconnaissance Platoon, Infantry Regiment, five lessons and a review.
20-9*	Combat Intelligence—II (com), 9 lessons and an examination.
20-10*	Motor Vehicles; Operation and Maintenance (com), eight lessons and an examination.
20-11	Tank Maintenance, (lesson and credits not yet announced).
20-12	Troop Movement and Bivouac—I, five lessons and an examination.
20-13	Communications in the Infantry Company, seven lessons and an examination.
20-14	Platoons of the Infantry Regiment in Defensive Combat, seven lessons and a review.
20-15	Rifle and Weapons Platoons in Attack, eight lessons and a review.
20-16	Heavy Weapons and Heavy Mortar Company Platoons in the Attack, eight lessons and a review.
20-17	The Infantry Tank Platoon in Attack, six lessons and a review.
20-18	Combat Supply and Evacuation of the Infantry Company, seven lessons and an examination.
20-19	Air Navigation (for pilots only) (com), nine lessons and an examination.
	30 SERIES
30-1*	Administration—II (com), nine lessons and an examination.
30-2*	Training Management, five lessons and an examination.

30-3* Terrain Evaluation—I (com), five lessons and an examination.
30-4* Preparation of a Field Exercise, five lessons and an examination.
30-5* Estimate of the Situation and Combat Orders—II (com), eight lessons and an examination.
30-6* Meterology for Light Aviation (for pilots only) (com), eight lessons and an examination.
30-7 Communications in the Infantry Battalion, eight lessons and an examination.
30-8 Troop Movement and Bivouac—II, seven lessons and an examination.
30-9 Reconnaissance and Security (com), five lessons and an examination.
30-10 Rifle Company in Defense, nine lessons and a review.
30-11 Heavy Weapons, Tank and Heavy Mortar Companies in Defense, seven lessons and a review.
30-12 Rifle Company in Attack—I, seven lessons and a review.
30-13 Rifle Company in Attack—II, seven lessons and a review.
30-14 Heavy Weapons, Tank and Heavy Mortar Companies in the Attack, seven lessons and a review.
30-15 Airborne Troops, nine lessons and an examination.
30-16 Combat Supply and Evacuation of the Infantry Battalion, six lessons and an examination.
30-17 Combat Supply and Maintenance of the Armored Infantry Battalion, three lessons and an examination.
30-18 Information and Education (com), three lessons and an examination.
30-19 The Special Services Officer (optional, com), (scope and other details not yet announced).
30-20 Duties of Exchange Officers (optional, com), (scope and other details not yet announced).

40 SERIES

40-1* Map and Aerial Photograph Reading III (com), seven lessons and an examination.
40-2* Rules of Land Warfare (com), seven lessons and an examination.
40-3 Military Goverment (com), six lessons and an examination.
40-4* Employment of Light Aviation—Ground Units (com), seven lessons and an examination.
40-5 Traffic Control, Reconnaissance and Planning (com), three lessons and an examination.
40-6 Combat Intelligence—III (com), nine lessons and an examination.
40-7 Troop Movements and Bivouac—III, eight lessons and an examination.

40-8* Staff Functions and Procedures, nine lessons and an examination.
40-9* Counterfire Organization and Techniques (com), five lessons and an examination.
40-10* Joint Air-Ground Operations, four lessons and a review.
40-11 Field Artillery in Support of Infantry, four lessons and a review.
40-12 Employment of Tanks Organic in the Infantry Division, four lessons and a review.
40-13 Tactics and Techniques of Engineers, five lessons and an examination.
40-14 Infantry Battalion in Defense, seven lessons and a review.
40-15 Infantry Battalion in Attack, seven lessons and a review.
40-16 Communication in an Infantry Regiment, nine lessons and an examination.
40-17 Combat Supply and Evacuation of the Infantry Regiment, six lessons and an examination.
40-18 Communication Responsibilities of Commanders and Staff Officers (com), (scope and other details not yet announced).
40-19 Military Boards and Investigations (optional, com), seven lessons and an examination.
40-20 Information and Education (com), (scope and other details not yet announced).

50 SERIES

50-1* Terrain Evaluation—II, five lessons and an examination.
50-2* Infantry Battalion and Regiment in Defensive Combat, seven lessons and a review.
50-3 Reinforced Infantry Battalion in Attack—I, eight lessons and a review.
50-4 Reinforced Infantry Battalion in Attack—II, eight lessons and a review.
50-5 Reinforced Infantry Battalion in Jungle and Mountain Operations, eight lessons and a review.
50-6 Infantry Battalion in Retrograde Movements, five lessons and a review.

60 SERIES

60-1* Tactical Use of Motors, nine lessons and a review.
60-2* Development and Security of an Infantry Regiment in Defensive Combat, six lessons and a review.
60-3* Infantry Regiment in Defense, seven lessons and a review.
60-4 Infantry Regiment in Attack, nine lessons and a review.
60-5 Reinforced Infantry Regiment in Offensive Combat, six lessons and a review.

Staff Planning for an Air-Transported Operation

This article deals with planning the air movement of a reinforced infantry battalion. Because the battalion is the basic tactical unit, most of the detailed planning is accomplished at this level; higher headquarters are usually concerned with consolidating the requirements from battalions and with allotting aircraft to battalions in accord with requirements and availability.

Whether the troops are moved by truck, rail, landing craft, or aircraft, the sequence of planning and the factors that affect planning are very much the same: The commander must know the capabilities and limitations of the means of transportation to be used. He must establish a priority of movement to insure that the essential elements of his command will arrive at the destination at the time they are needed. He must formulate plans to make the maximum use of each carrier. And he must publish sufficient information to his subordinates so that they can execute the details of the general plan.

CAPABILITIES AND LIMITATIONS OF AIRCRAFT

The capabilities of a particular aircraft to carry cargo depends on the allowable cargo load of the aircraft, the location of the cargo door, the size of the cargo entrance, the size of the cargo compartment, and the strength of the cargo floor. When considered collectively these factors are termed "cargo carrying characteristics."

The Air Force will be able to furnish data for the type of cargo aircraft used in the operation, or a commander may consult charts and graphs from existing field manuals. When C-82 aircraft are used, for example, the commander can determine the cargo carrying characteristics from a chart similar to the one shown in figure 1.

CARGO CARRYING CHARACTERISTICS C-82

Allowable cargo load (air transport)	pounds	11,000
Height of door from ground	inches	48
Width of door	inches	96
Height of door	inches	96
Means of loading		ramp and sliding strip
Width, cargo compartment	inches	96
Length, cargo compartment	inches	456
Number of seats		41
Number of litters		34
Cruising speed	mph	185
Maximum range	miles	3,900
Recommended maximum take-off weight	pounds	54,000
Recommended maximum landing weight	pounds	47,200
Minimum take-off distance	feet	2,500
Minimum landing distance	feet	1,800

FIGURE 1

The allowable cargo load as listed in the table of characteristics is a variable factor. For a short flight some of the tonnage normally required for fuel may be used for cargo; for a long flight some of the tonnage normally used for cargo is required for additional fuel. Figure 2 indicates the general relationship between the radius of flight and the allowable cargo load of a C-82 aircraft. The term "radius of flight" indicates that the plane must carry sufficient fuel to return to the point of origin.

The location of the cargo door restricts the items that can be loaded. Note that the cargo door in the C-46 (see figure 3) is on the side of the fuselage, while in the C-82 the cargo doors are at the rear of the fuselage. It is obviously much easier to load bulky equipment through the large doors of the C-82, not only because the doors are larger but because they permit a straight entry into the cargo compartment. The steep angle of the loading ramps leading to the door of the C-46 makes it difficult to move bulky equipment into the cargo compartment.

Because the size of the cargo doors and the dimensions of the cargo compartment restrict the bulk that can be loaded in an aircraft, most commercially produced transport aircraft are not readily adaptable to military usage. The C-54, for example, has a normal cargo capacity of 20,000 pounds—9,000 pounds more than the C-82—however, the largest piece of equipment that can be loaded without disassembly in the C-54 is a ¼-ton truck. (See figure 4.)

Cargo gliders afford maximum utilization of cargo space. In the CG-15A, for example, the cargo door is actually the nose of the glider (see figure 5). The loading ramp is an integral part of the glider and it automatically falls into position when the nose is opened. The maximum recommended cargo load is 3,560 pounds.

The strength of the cargo floor of an aircraft limits the dead weight that can be placed in a given area of floor space. In the C-82 the maximum loading is 200 pounds per square foot. For heavy items of equipment, load spreaders made of 2″x 12″ wooden planks are used to distribute the dead weight over a greater area.

C-82A PACKET

CARGO LOAD VS DISTANCE GRAPH

(Indicated Air Speed—165 mph)

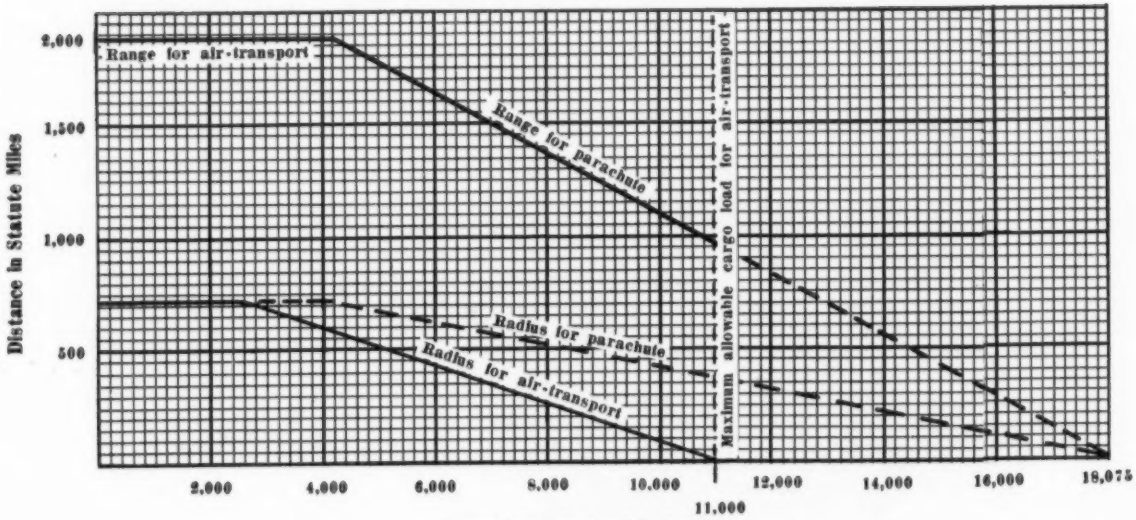


FIGURE 2. Readings on this chart are used for planning purposes only.

CARGO CARRYING CHARACTERISTICS C-46

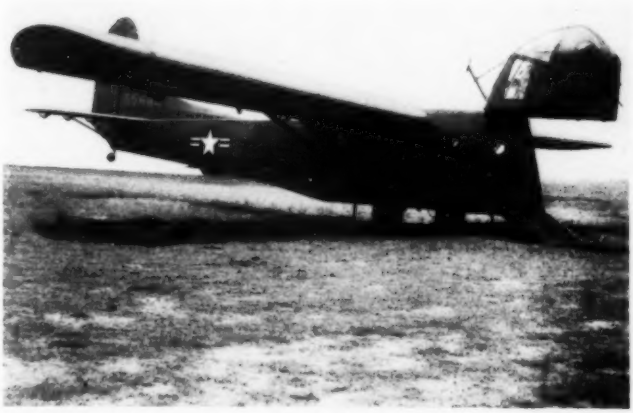
Width of door	inches	95.5
Height of door:		
Forward jamb	inches	78.5
Aft jamb	inches	66.5
Location of door	rear of fuselage	both sides
Height of door from ground	inches	102
Means of loading		ramp
Width of cargo compartment	inches	102
Length of cargo compartment	inches	576
Number of seats		50
Type seats: 40 folding in banks of 2, 3, and 4. Ten buckets, along center line that are removable.		
Maximum gross weight	pounds	49,600
Maximum allowable cargo load (air transport)	pounds	11,500
Take-off distance (minimum) (45,000# gross)	feet	3,700
Landing distance (minimum) (45,000# gross)	feet	4,600

FIGURE 3

CARGO CARRYING CHARACTERISTICS C-54

Allowable cargo load	pounds	20,000
Height of door from ground	inches	108
Width of door	inches	95
Height of door	inches	67
Means of loading		ramp or beam hoist
Width, cargo compartment	inches	108
Length, cargo compartment	inches	597
Number of seats		49
Number of litters		36
Cruising speed	mph	200
Normal fuel capacity	gallons	2,840
Maximum range	miles	4,500
Recommended maximum take-off weight	pounds	73,000
Recommended maximum landing weight	pounds	62,000
Minimum take-off distance	feet	4,600
Minimum landing distance	feet	2,400

FIGURE 4



CARGO CARRYING CHARACTERISTICS CG-15A

Width of cargo door	inches	70
Height of cargo door	inches	66
Location of cargo door		formed by lifting nose
Height of door sill from ground (tail lowered)	inches	38
Height of door sill from ground (tail raised)	inches	24
Means of loading (tail raised only)		ramp
Width of cargo compartment (seats folded)	inches	66
Width of cargo compartment (seats removed)	inches	70
Length of cargo compartment	inches	158
Height of cargo compartment, at front	inches	66
Height of cargo compartment, at rear	inches	60
Number of seats (in addition to pilot and co-pilot)		14 or 15
Maximum gross weight:		
Recommended	pounds	8,000
Emergency	pounds	9,000
Allowable cargo load:		
Recommended	pounds	3,560
Emergency	pounds	4,560
Weight of glider, ready for cargo loading	pounds	4,440

FIGURE 5

FIRST PROBLEM

The following questions are based on the information contained in the preceding paragraphs and figures 1 to 3. For answers, see page 155.

a. A ¼-ton 4x4 truck is 132¼ inches long, 62 inches wide, and weighs 2,450 pounds. How many ¼-ton trucks can be loaded in a C-82?

b. What is the allowable cargo load for a C-82 on a radius air transport operation with the airhead 500 miles from the departure airfield?

c. What is the maximum distance that a C-82 can transport a cargo load of 5,600 pounds on a radius air transport operation?

d. Some of the cargo carrying characteristics of the C-82 and the C-46 are similar:

Aircraft	*Allowable cargo load for air transported operation*	*Number of personnel transported*	*Largest load carried*
C-46	11,500 pounds	50	¾-ton truck (stripped) with 105-mm How, M2.
C-82	11,000	41	2½-ton truck LWB

In what respects is the C-82 superior to the C-46 for air transport operation?

BASIC PLANNING GUIDE

During the planning phase of an air transport operation the commander of the troop carrier unit usually designates the maximum load for the types of aircraft employed. The commander of the unit being moved is responsible for maintaining the load of each aircraft within the designated figure. To determine the number of personnel and the number of items of equipment that are available to be transported by air, the ground commander prepares a basic planning guide.

The basic planning guide (Air Movement Form No. 1) is a list of all personnel and all vehicular equipment in the ground unit. It is broken down to show the number of personnel and pieces of equipment that move in the air echelon, the number that will move with the land or sea echelon, and the number that will remain with the rear echelon. (See figure 6.)

The making up of the basic planning guide can best be learned by doing it. In the following situation assume that you are the battalion commander of the unit being moved.

The 1st Infantry Division, at Fort Benning, Georgia, has been ordered to move by air from Lawson Air Force Base, Georgia, to an assembly area in the vicinity of an abandoned airfield. Your battalion, the 1st Battalion (reinforced) of the 1st Infantry, part of Combat Team 1 (CT 1), is to be flown in CG-15A gliders with the mission of securing the airfield for the landing of the remainder of the Combat Team. All air movement subsequent to the glider landing of the 1st Battalion will be by C-82 aircraft.

The division commander has directed that all units submit reports on personnel and equipment available to move by air.

The regimental commander has directed his battalion commanders to prepare the desired status reports.

You have the following information:

a. Four aid men from the medical platoon will be attached to each rifle company, and three aid men will be attached to the heavy weapons company. The remainder of the medical platoon and the vehicles will be attached to battalion

BASIC PLANNING GUIDE

Form No. 1

OPERATION.....*Airlift*.....

HQ.....*1st Bn, 1st Inf*.....

DATE.....*22 Oct 49*.....

ORG	PERSONNEL PLANE		MOVED BY GLIDER		LAND OR SEA ECH		REAR ECHELON		LEFT OUT OF BATTLE		VEHICLES PLANE	MOVED BY GLIDER	LAND OR SEA ECH	REAR ECHELON	REMARKS
	OFF	EM	OFF	EM	OFF	EM	OFF	EM	OFF	EM	NO & TYPE	NO & TYPE	NO & TYPE	NO & TYPE	
Hq Co			1* 2** 9 12	4* 19** 6*** 91 120		1** 4	1	3	1	5		1 Trk ¼T*** 9 Trk ¼T 1 Trl ¼T*** 3 Trl ¼T	1 Trk ¾T 1 Trk 1½T** 3 Trk 1½T 2 Trl 1T	1 Trk ¼ T 1 Trl ¼ T	*Atchd fr Div **Medical ***Counter-fire squad

FIGURE 6

headquarters and headquarters company. Company E will receive its medical personnel from the medical platoon of the 2d Battalion.

b. A counterfire squad will be attached to Battalion Headquarters Company.

c. The ¼-ton trucks and ¼-ton trailers are the only organic vehicles that can be carried in CG-15A gliders.

d. The 1st Battalion (reinforced) consists of the following units, all of which are at T/O & E strength in personnel and equipment:

UNIT	O	EM	TRUCKS				TRAILERS		
			¼-T	¾-T	1½-T	2½-T	¼-T	1-T	1-T (Water)
Hq & Hq Co, 1st Bn	11	103	9	1	3	0	3	2	0
Co's A, B, C, plus Co E (Attached)	6	203	2	0	0	1	2	1	0
Co D (Hv Wpns Co)	5	151	13	3	0	1	8	3	0
Med Plat	2	35	1	0	1	0	1	0	0
Counterfire Squad	0	6	1	0	0	0	1	0	0
Co A, 1st Engr (C) Bn	5	162	4	3	0	1	4	4	1

The engineer company has the following additional vehicles: 9 trailers, 2½-ton pole type; 1 semi-trailer, 20-ton; 13 trucks, 2½-ton, dump; 1 truck, 6-ton tractor; 1 compressor, air; 1 tractor, w/angle dozer.

e. The rear echelon from each company consists of the following officers, enlisted men, and vehicles:

Headquarters and Headquarters Company, 1st Battalion:
1 O
3 EM
1 trk, ¼-T
1 trl, ¼-T

Company A:
4 EM

Company B:
4 EM

Company C:
4 EM

Company D:
4 EM

Company E:
4 EM

Company A, 1st Engineer (C) Battalion:
3 EM

f. Personnel left out of battle are as follows:

Headquarters and Headquarters Company, 1st Battalion:
1 O
5 EM

Company A:
8 EM

Company B:
1 O
7 EM

Company C:
8 EM

Company D:
1 O
6 EM

Company E:
1 O
7 EM

Company A, 1st Engineer (C) Battalion:
4 EM

g. The land echelon will be made up of all trucks and trailers over ¼-ton capacity. One officer from Company A, 1st Engineer (C) Battalion, will be in command of all vehicles in the overland echelon of the battalion (reinforced). One enlisted man will accompany each gas consuming vehicle in the overland echelon.

h. Additional attachments from division to the 1st Battalion are as follows:

(1) To Headquarters and Headquarters Company, 1st Battalion—1-0 and 4-EM.

(2) To Company A, 1st Engineer Combat Battalion—6-O and 13-EM.

All of this information is consolidated and put into easily understandable form on the basic planning guide. In this case planning is simplified because gliders are being used for the movement; only ¼-ton trucks and ¼-ton trailers will accompany the air echelon and the heavier vehicles, which the glider cannot lift, will move with the land echelon.

Because of the diversity of equipment, the headquarters and headquarters company is the most difficult to load. Using the information available to the battalion commander the entries for this company can be made in the proper column of the basic planning guide. (See figure 6.)

Paragraph *e* above indicates that the rear echelon will consist of one officer and three enlisted men and that one ¼-ton truck and one ¼-ton trailer remain with the rear echelon. These figures can be placed in the columns labeled "rear echelon."

Paragraph *f* above indicates that one officer and five enlisted men will not be available for the operation; these figures are placed in the "left out of battle" column.

Paragraph *h* above indicates that one officer and four enlisted men are attached from division. These men should be listed under the column "personnel moved by glider," and the figures noted by an asterisk. The explanation of the asterisk is entered under remarks.

Next the vehicles can be entered in the proper column. Since only ¼-ton trucks and ¼-ton trailers will move by glider they can be entered first. The one ¼-ton truck and the ¼-ton trailer from the attached counterfire squad should be entered under the glider column and marked with three asterisks. The three asterisks are explained in the remarks column. The headquarters company has a total of nine ¼-ton trucks and three ¼-ton trailers. The medical platoon has one additional ¼-ton truck and one ¼-ton trailer bringing the total up to ten trucks and four trailers. The rear echelon of the company, however, retains one of the ¼-ton trucks and a ¼-ton trailer, making the total transported by glider nine trucks and three trailers. These figures are entered in the appropriate column.

All vehicles heavier than ¼-ton move with the land echelon. In this category headquarters company has one ¾-ton truck, three 1½-ton trucks, and two 1-ton trailers, and the medical platoon has one 1½-ton truck. These vehicles are entered in the appropriate column. The medical vehicle is designated by two asterisks and an explanation is entered in the remarks column.

To make the proper entries in the personnel columns it is best to enter the attached troops first. Since a driver accompanies each vehicle in the land echelon, one driver for the

medical 1½-ton truck should be entered in the "land or sea echelon" column and marked with two asterisks in the same manner as the medical vehicles. Four drivers from headquarters company, one for the ¾-ton truck and one for each of the three 1½-ton trucks, are entered in the same column.

The status of the medical platoon is a little more difficult to determine. Of the total strength of 2 officers and 35 enlisted men, 15 will normally be attached to the letter companies—four to each rifle company and three to the heavy weapons company. This leaves a balance of 2 officers and 20 enlisted men. One of these enlisted men, however, is the driver who has already been listed under the "land or sea echelon" column. The actual figure then, is 2 officers and 19 enlisted men from the medical platoon to move by glider.

The six-man counterfire squad attached from regimental headquarters company is entered and marked with three asterisks—the same as the counterfire ¼-ton truck and ¼-ton trailer.

The figure for the headquarters company itself can be determined by subtracting the number already listed from the total strength of the company. Of the 11 company officers one is listed under the "rear echelon" column and one is listed under the "left out of battle" column. The balance of nine is entered under the "moved by glider" column. The total enlisted strength of 103 must be decreased by four to compensate for the vehicle drivers in the land echelon, three for the men who remain with the rear echelon, and five for the men left out of battle. The figure 91 is entered under the "moved by glider" column.

The total number of officers to move by glider is 12; enlisted men, 120. To check the accuracy of the basic planning guide, the number of individuals to move by plane or glider are added to the number listed in the other personnel columns. If the total is the same as the total strength of the company plus attachments, the figures are correct. The same check should be made for vehicles and trailers.

SECOND PROBLEM

a. From the data available to you as battalion commander, complete your basic planning guide (figure 7) for Company A.

b. Complete the basic planning guide (figure 7) for Company D.

c. The basic planning guide for Company A, 1st Engineer Combat Battalion (figure 7) is complete except for the number of personnel to be moved by glider. The actual strength of the company is 5 officers and 162 enlisted men plus 6 officers and 13 enlisted men attached from division headquarters. Compute the total number of officers and enlisted men that will be moved by glider.

BASIC PLANNING GUIDE

Form No. 1

OPERATION.....*Airlift*.....

HQ.....*1st Bn, 1st Inf*.....

DATE.....*22 Oct 49*.....

ORG	PERSONNEL MOVED BY PLANE		PERSONNEL MOVED BY GLIDER		LAND OR SEA ECH		REAR ECHELON		LEFT OUT OF BATTLE		VEHICLES MOVED BY PLANE	VEHICLES MOVED BY GLIDER	LAND OR SEA ECH	REAR ECHELON	REMARKS
	OFF	EM	OFF	EM	OFF	EM	OFF	EM	OFF	EM	NO & TYPE	NO & TYPE	NO & TYPE	NO & TYPE	
Co A						1		4		8		2 Trk ¼T 2 Trl ¼ T	1 Trk 2½T 1 Trl 1T		
Co D															
Co A 1st Engr (C) Bn					1	20		3		4		4 Trk ¼T 4 Trl ¼T	3 Trk ¾T 1 Trk 2½T 4 Trl 1T 1 Trl (Water) 9 Trl, Pole 1 Semi Trl 20T 13 Trk 2½T, Dump 1 Trk, 6T Trac 1 Comp Air, Trk Mtd 1 Trac, w/ angle dozer		

Note: Check your solution with Figure 12 on page 156 prior to going to next problem

FIGURE 7

AIR MOVEMENT TABLE

The basic planning guides from the battalions are consolidated by regiment and forwarded to division. The division commander uses the information obtained from the consolidated basic planning guides as a basis for his request for cargo aircraft.

Coordination between air and ground commanders is effected at a joint conference. The troop carrier commander announces the departure airfields, designates the number of aircraft that will be available at each field, announces the maximum cargo load for each type of aircraft used in the operation, and answers any questions concerning the air movement. The ground commander designates the number of men and the tonnage of equipment and supplies that must be moved. Coordination between the two commanders and their staffs is made easier by mutual understanding of the common problems.

The decisions made at the joint conference are crystallized in the form of a division air movement table (figure 8). The first five columns of the air movement table are filled in by the troop carrier commander. The serial number in column one designates a troop carrier group that will depart at a given time from one airfield. The carrier unit designation is listed in column two. The serial commander listed in column three is the troop carrier group commander. The number and types of gliders or planes listed in column four and five are determined by the troop carrier commander based on requirements and availability.

Columns six through eleven are completed by the ground force commander based on the consolidated basic planning guides submitted by combat team commanders. If sufficient aircraft are not available to transport all of the air transportable echelons, the ground commander determines the priority of movement. The "unit plane assignment" column designates the numerical breakdown of the available aircraft to combat teams. The "planes loaded with" column designates the ground unit to be carried in each serial.

The "serial commander" column designates the commander of the ground unit carried in each serial. The next three columns contain similar information pertaining to units transported by glider.

The last five columns indicate the departure field, the hour the plane will be available for loading, the time all personnel and equipment must be loaded and ready for flight (stations time), the take-off time, and the objective area. Both commanders agree on the data inserted in these columns.

When the division air movement table is complete, copies are distributed to subordinate commanders as an annex to the division operation order. Combat team commanders are then responsible for further breaking down the information contained in columns six through eleven.

AIR MOVEMENT TABLE
Form No. 2

(Extract from Division Air Movement Table)

ANNEX.....*I*..... to Opn O .....*1*.....

MAPS.....*None*.....

HQ..... *1st Inf Div* .....

PLACE ..... *Fort Benning, Ga.* .....

HOUR & DATE.....*260800 Oct 49*.....

SERIAL NO.	AIR FORCE UNITS				GROUND FORCE UNITS						DEPART FROM	HOUR LOADING BEGINS	STATIONS (TIME)	TAKE OFF	OBJECTIVE
	CARRIER UNIT	SERIAL CO	NO/TYPE GLIDERS	NO/TYPE PLANES	UNIT PLANE ASGMT	PLANES LOADED WITH	SERIAL CO	UNIT GLIDER ASGMT	GLIDERS LOADED WITH	SERIAL CO					
1	501 Gp	Col Bradley	CG-15A 142	C-82 71	52 10 9			104 20 18	1st Bn, 1st Inf Co E Co A, Engr Bn	Lt Col 1st Bn	Lawson	0100 D-Day	0400 D-Day	0430 D-Day	A
2	501 Gp	Col Bradley		64	61 3	CT 1 Div Hq	Asgd by CO CT1				Lawson	0100 D+2	0400 D+2	0430 D+2	A
3	502 GP	Col Jones		64	61 3	CT 1 Div Hq	Asgd by CO CT1				Lawson	0100 D+2	0430 D+2	0500 D+2	A
4	503 Gp	Col Scott		64	64	CT 1	Asgd by CO CT1				Lawson	0100 D+2	0500 D+2	0530 D+2	A
5	504 Gp	Col Bland		64	63 1	CT 1 Div Hq	Asgd by CO CT1				Lawson	0100 D+2	0530 D+2	0600 D+2	A
6	505 Gp	Col Sharp		64	63 1	CT 1 Div Hq	Asgd by CO CT1				Lawson	0100 D+2	0600 D+2	0630 D+2	A
•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

Figure 8

THIRD PROBLEM

Upon receipt of the division operation order, the commander of CT 1 directed his S-3 to prepare the combat team air movement table. The following information was available in addition to the allocation of aircraft indicated in figure 8.

a. The 1st Field Artillery Battalion is attached to the 1st Infantry for movement.

b. Company A, 1st Engineer Combat Battalion is attached to the 1st Infantry for movement.

c. The requirements for C-82 aircraft for units of Combat Team 1 are as follows:

ORGANIZATION	*NO.*
Regimental Headquarters and Headquarters Company	20
Service Company	70
Heavy Mortar Company	27
Regimental Medical Company (-)	17
Regimental Tank Company	(not air transported)
Infantry Battalion	41
Rifle Company	7
Engineer Company	6
Headquarters and Headquarters Battery 105-mm How	20
Field Artillery Battery (3 per Battalion)	21
Service Battery	20

d. The composition of the first serial will be as shown in the division air movement table (figure 8). Each C-82 aircraft in the first serial will tow two CG-15A gliders.

e. Division is reserving the following airplanes for movement of division headquarters:

Serial	*No. of Planes*
2	3
3	3
5	1
6	1

Assuming that the combat team commander designates the general sequence of movement as 1st Battalion, 2d Battalion, Heavy Mortar Company, 3d Battalion, Regimental Headquarters, Service Company, Medical Company (minus), and attached artillery, complete the regimental air movement table (figure 9).

AIR MOVEMENT TABLE
Form No. 2

(Regimental Air Movement Table)
ANNEX .....*1*..... to Opn O .....*1*.....
MAPS .....*None*.....

HQ ..... *CT 1* .....
PLACE ..... *Fort Benning, Ga.* .....
HOUR & DATE .....*261200 Oct 49*.....

SERIAL NO.	AIR FORCE UNITS				GROUND FORCE UNITS						DEPART FROM	HOUR LOADING BEGINS	STATIONS (TIME)	TAKE OFF	OBJECTIVE
	CARRIER UNIT	SERIAL CO	NO/TYPE GLIDERS	NO/TYPE PLANES	UNIT PLANE ASGMT	PLANES LOADED WITH	SERIAL CO	UNIT GLIDER ASGMT	GLIDERS LOADED WITH	SERIAL CO					
1	501 Gp	Col Bradley	CG-15A 142	C-82 71	52 10 9			104 20 18	1st Bn, 1st Inf Co E Co A, Engr (C) Bn	Lt Col 1st Bn	Lawson	0100 D-Day	0400 D-Day	0430 D-Day	A
2	501 Gp	Col Bradley		64							Lawson	0100 D+2	0400 D+2	0430 D+2	A
3	502 Gp	Col Jones		64							Lawson	0100 D+2	0430 D+2	0500 D+2	A
4	503 Gp	Col Scott		64							Lawson	0100 D+2	0500 D+2	0530 D+2	A
5	504 Gp	Col Bland		64							Lawson	0100 D+2	0530 D+2	0600 D+2	A
6	505 Gp	Col Sharp		64							Lawson	0100 D+2	0600 D+2	0630 D+2	A

Figure 9

AIR LOADING TABLE

As soon as the regimental air movement table is completed, copies are distributed to battalions. Based on this information and the information contained in the battalion basic planning guide, the battalion commander is able to designate which aircraft will be used to lift each company and exactly what each aircraft will carry.

Some of the information needed to complete the air loading table (figure 10) is readily available. The serial number and the carrying unit will be the same as shown on the regimental air movement table. Before going any further, however, the battalion commander must compute the information for column five if powered aircraft are being used, or for column six if gliders are being used.

The information that goes in these columns depends on the type loads computed for the operation. A type load is a combination of vehicles and personnel whose combined weight is within the allowable cargo load of the aircraft to be used for the operation. To compute type loads the commander checks the basic planning guide to determine how many different types of vehicles are to be transported. Various combinations of vehicles and personnel are then designated as type 1, type 2, etc. loads. By applying the weight-distance formula or by use of a load adjuster (a slide rule for computing weight and balance data) the items of equipment and the personnel are assigned a definite station number (position) within the aircraft. The term "station number" refers to the distance in inches from the reference datum (usually the nose of the aircraft) to the center of gravity of the item to be loaded. Station number 225 for a vehicular load, for example, means that the center of gravity of the vehicle is located 225 inches in rear of the nose of the aircraft.

One type load for the CG-15A, for example, consists of:

Item	*Station No. or Seats*	*Weight*
¼-ton truck, with 400 pounds of equipment;	165	2853 pounds
3 men (@ 220 pounds per man)	13, 14, 15	660
		3513

For a C-82A one type load is:

1½-ton truck, cargo, 6x6		6675 pounds
w/2 men;	235	440
1-ton trailer	480	1300
w/2000 pounds equipment;		2000
2 men (@ 200 pounds per man)	40 and 41	440
		10,855

After the type loads are computed the commander can determine by inspection whether a subordinate unit will need all of the type loads or only part of them. If moving by C-82 for example, the heavy weapons company must have one type load for each type of vehicle; the rifle companies, on the other hand, would need fewer type loads because they do not have ¾-ton vehicles to move. After the necessary type loads for each of the subordinate units are computed, columns 3, 4, and 5 (or 6) can be filled in.

In column three, "chalk number of glider", the inclusive numbers of the planes designated to carry a particular type load (shown in column five or six) for a particular unit (shown in column four) are entered. Chalk number refers to a number chalked near the door of each aircraft by the ground force troops to simplify identification. Chalk numbers run consecutively from number one at each departure airfield.

AIR LOADING TABLE
Form No. 3

ANNEX ..... *to Opn O* .....
DEPARTURE AIRFIELD.... *Lawson* .....
LOADING STARTS.... *0100 D-Day* .....
STATIONS..... *0400 D-Day* .....

HQ....*1st Battalion, 1st Inf*.....
PLACE....*Ft. Benning, Ga.*.....
DATE.... *270800 Oct 49* .....

1 SERIAL NO.	2 CARRIER UNIT	3 CHALK NO. OF GLIDER	4 GND FORCE UNIT	5 PLANE LOADED WITH	6 GLIDERS LOADED WITH	7 REMARKS, INCLUDING SPECIAL EQUIPMENT NEEDED FOR LOADING AND TOTAL PAYLOAD.
1	501 Gp	1-10	Hq Co		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	11-14	Hq Co		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	15-20	Hq Co		11 men 800 #	3220
1	501 Gp	21-22	Co A		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	23-24	Co A		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	25-40	Co A		11 men 800 #	3220
1	501 Gp	41-42	Co B		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	43-44	Co B		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	45-60	Co B		11 men 800 #	3220
1	501 Gp	61-62	Co C		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	63-64	Co C		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	65-80	Co C		11 men 800 #	3220
1	501 Gp		Co D			
1	501 Gp					
1	501 Gp					
1	501 Gp	105-106	Co E		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	107-108	Co E		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	109-124	Co E		11 men 800 #	3220
1	501 Gp		Co A, 1st Engr (C) Bn			
1	501 Gp					
1	501 Gp					

Figure 10.

Column seven is self-explanatory except that the total weight of cargo is habitually entered in addition to other information.

The air loading table for the battalion headquarters company is the most difficult to compute because the company has more vehicles. Figure 10 indicates that two type loads are used for loading Headquarters Company, 1st Battalion, 1st Infantry:

Type	*Items*	*Station No. or Seats*	*Weight*
1	¼-ton truck with 400 pounds;	165	
	3 men (@ 220 pounds)	13, 14, 15	3513
2	¼-ton trailer with 500 pounds;	150	
	9 men (@ 220 pounds)	7-15	3030

In addition, the loading table indicates that 11 men and their equipment (@ 220 pounds per man) plus 800 pounds of equipment can be transported in one glider.

Because the company has ten ¼-ton trucks they make up ten type one loads; four type two loads are required to transport the ¼-ton trailers. The balance of the company strength not included in type loads is divided into 11-man loads and assigned to six gliders.

The table entries for Companies A, B, C, and E are essentially the same; each requires two type one loads and two type two loads, and the remainder of the personnel are divided into 11-man groups for movement.

FOURTH PROBLEM

Using the information contained in the basic planning guide for the 1st Battalion, 1st Infantry reinforced (figure 7) and in the regimental air movement table (figure 9), compute the entries in figure 10 for Company D, 1st Infantry and for Company A, 1st Engineer Combat Battalion.

FLIGHT MANIFEST

Using the information published in the air loading table, the company commander assigns individuals and equipment to specific aircraft by chalk number. This assignment is made on a flight manifest (figure 11).

The flight manifest serves a dual purpose. In addition to designating the exact location in a particular aircraft for each piece of equipment and for each individual, the computation at the bottom of the flight manifest indicates whether the loaded aircraft is safe to fly.

FLIGHT MANIFEST

(FORM 4)

Operation AIRLIFT

Date 30 October 1949

Aircraft No. C G 1256 Chalk No. 23 Serial 1

Departure Field LAWSON Landing Area A

Personnel: (*)

SEAT NO.	RANK	NAME	ASN	ORG.	REMARKS
7	PFC	LAKE, JACK F.	RA69547012	Co A	
8	PVT	MURPHY, JOHN T.	RA5207653	Co A	
9	PFC	UNDERWOOD, CHARLES T.	RA9120654	Co A	
10	SGT	DICKSON, NED R.	RA16152001	Co A	
11	CPL	GUERIN, VINCENT M.	RA31419414	Co A	
12	1st Lt.	COFFEY, ROBERT M.	O-34822	Co A	TROOP COMMANDER
13	S/SGT	DOBRINIC, MATT P.	RA6019621	Co A	
14	T/SGT	FINKE, JOHN (NMI)	RA6593281	Co A	
15	PVT	CONRAD, EUGENE (NMI)	RA5320012	Co A	

Equipment:

NO.	ITEM	WEIGHT	STA. NO.	MOMENT
1	CG-15A (Ready for Loading)	4440	225	999,000
2	Trailer 1/4-Ton (W/500 #)	1050	150	157,500
3	6 men (Seats 7-12)	1320	201	265,320
4	3 men (Seats 13-15)	660	250	165,000
	Total	7470		1,586,820

Inspection made and Computations verified

CG = (212) Sta. No.

7470 | 1,586,820

Robert M. Coffee 1st Lt 1st INF
TROOP COMMANDER

John A. Prey 1st Lt AF
PILOT

*List Air Force Personnel after Ground Force Personnel

**Insert Type of Aircraft

SOLUTIONS

1. Solution to the 1st problem;

a. 3

b. 5100 pounds

c. 450 miles

d. The cargo doors of the C-82 are much larger and are positioned at the tail of the aircraft to permit straight access to the cargo compartment. The doors are built much lower to the ground so that the loading ramp enters the door at a shallow angle. The overall size of the cargo compartment is much larger in the C-82.

2. Solution to the 2d problem:
   (See figure 12.)

3. Solution to the 3d problem:
   (See figure 13.)

4. Solution to the 4th problem:
   (See figure 14.)

BASIC PLANNING GUIDE
Form No. 1

HQ.....*1st Bn, 1st Inf*.....

OPERATION.....*Airlift*.....

DATE ..... *22 Oct 49* .....

ORG	PERSONNEL MOVED BY PLANE		PERSONNEL MOVED BY GLIDER		LAND OR SEA ECH		REAR ECHELON		LEFT OUT OF BATTLE		VEHICLES MOVED BY PLANE	VEHICLES MOVED BY GLIDER	LAND OR SEA ECH	REAR ECHELON	REMARKS
	OFF	EM	OFF	EM	OFF	EM	OFF	EM	OFF	EM	NO & TYPE	NO & TYPE	NO & TYPE	NO & TYPE	
Co A			6	4** 190		1		4		8		2 Trk ¼ T 2 Trl ¼ T	1 Trk 2½ T 1 Trl 1 T		** Medical
			6	194											
Co D			4	3** 137		4		4	1	6		13 Trk ¼ T 8 Trl ¼ T	1 Trk 2½ T 3 Trl 1 T 3 Trk ¾ T		** Medical
			4	140											
Co A 1st Engr (C) Bn			6* 4	13* 135	1	20		3		4		4 Trk ¼ T 4 Trl ¼ T	3 Trk ¾ T 1 Trk 2½ T 4 Trl 1 T 1 Trl (Water) 9 Trl, Pole 1 Semi Trl, 20 T 13 Trk 2½ T, Dump 1 Trk, 6T Trac 1 Comp Air, Trk Mtd 1 Trac, w/ angle dozer		*Atchd fr Div
			10	148											

Figure 12

AIR MOVEMENT TABLE
Form No. 2

(Regimental Air Movement Table)
ANNEX.....*1*.....to Opn O .....*1*.....
MAPS.....*None*.....

HQ..... *CT 1* .....
PLACE.....*Fort Benning, Ga.*.....
HOUR & DATE.....*261200 Oct 49* .....

SERIAL NO.	AIR FORCE UNITS				GROUND FORCE UNITS						DEPART FROM	HOUR LOADING BEGINS	STATIONS (TIME)	TAKE OFF	OBJECTIVE
	CARRIER UNIT	SERIAL CO	NO/TYPE GLIDERS	NO/TYPE PLANES	UNIT PLANE ASGMT	PLANES LOADED WITH	SERIAL CO	UNIT GLIDER ASGMT	GLIDERS LOADED WITH	SERIAL CO					
1	501 Gp	Col Bradley	CG-15A 142	C-82 71	52 10 9			104 20 18	1st Bn, 1st Inf Co E Co A, Engr (C) Bn	Lt Col 1st Bn	Lawson	0100 D-Day	0400 D-Day	0430 D-Day	A
2	501 Gp	Col Bradley		64	34 27 3	2d Bn Hv Mort Co Div Hq	Lt Col 2d Bn				Lawson	0100 D+2	0400 D+2	0430 D+2	A
3	502 Gp	Col Jones		64	41 20 3	3d Bn Regtl Hq & Hq Co Div Hq	Lt Col 3d Bn				Lawson	0100 D+2	0430 D+2	0500 D+2	A
4	503 Gp	Col Scott		64	64	Sv Co	Capt Sv Co				Lawson	0100 D+2	0500 D+2	0530 D+2	A
5	504 Gp	Col Bland		64	6 17 20 20 1	Sv Co Med Co (—) Hq Btry, 1st FA Bn Sv Btry, 1st FA Bn Div Hq	Lt Col FA Bn				Lawson	0100 D+2	0530 D+2	0600 D+2	A
6	505 Gp	Col Sharp		64	21 21 21 1	Btry A, 1st FA Bn Btry B, 1st FA Bn Btry C, 1st FA Bn Div Hq	Capt Btry A				Lawson	0100 D+2	0600 D+2	0630 D+2	A

Figure 13

AIR LOADING TABLE
Form No. 3

ANNEX *2* to Opn O *1*

DEPARTURE AIRFIELD *Lawson*

LOADING STARTS *0100 D-Day*

STATIONS *0400 D-Day*

HQ *1st Battalion, 1st Inf*

PLACE *Ft. Benning, Ga.*

DATE *270800 Oct 49*

1 SERIAL NO.	2 CARRIER UNIT	3 CHALK NO. OF PLANE	4 GND FORCE UNIT	5 PLANE LOADED WITH	6 GLIDERS LOADED WITH	7 REMARKS, INCLUDING SPECIAL EQUIPMENT NEEDED FOR LOADING AND TOTAL PAYLOAD.
1	501 Gp	81-93	Co D		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	94-101	Co D		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	102-104	Co D		11 men 800 #	3220
1	501 Gp	125-128	Co A, 1st Engr (C) Bn		1 Trk ¼ T w/400 # 3 men	3513
1	501 Gp	129-132	Co A, 1st Engr (C) Bn		1 Trl ¼ T w/500 # 9 men	3030
1	501 Gp	133-142	Co A, 1st Engr (C) Bn		11 men 800 #	3220

Figure 14

CONCLUSION

The successful accomplishment of an air transported operation requires detailed prior planning. This planning, of necessity, must follow a definite sequence to insure the arrival of the unit in the objective area with all of its essential equipment. The staff planning required is not too difficult, however accuracy is necessary on the part of all concerned. The four basic air movement forms discussed in this article provide a ready means of consolidating data and disseminating information to the next echelon. Basically, a move by air is no more difficult than a move by water, rail, or on non-organic motor transport, except there is less margin for error.